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Output of 2,4,5-T, DDT in June Passes May's Production

Tariff Commission Says Some Chemical Products Have Reduced Output

WASHINGTON — Production of DDT and 2,4,5-T increased during the month of June over May, according to a report just issued by the U.S. Tariff Commission in its "Facts for Industry" series.

Production of DDT in June was 14,604,103 lb., the report says, as compared to 14,095,493 lb.

Output of 2,4,5-T rose to 582,279 lb. in June, from the total of 570,830 lb. the month before. This figure for May, incidentally, is revised from earlier accounts.

Production figures for June on 2,4-D were not given, but May's production had been 2,569,493 lb.

A reduced output was recorded for 2,4-D acid esters and salts, however. The output for May was 3,013,108 lb., but June's production came to only 2,738,076 lb. Similar reductions in June were seen for 2,4-D acid equivalent of esters and salts, with figures of 2,037,753 and 1,838,713 lb., respectively for May and June.

Benzene hexachloride production (including Lindane) was set at 1,794,325 lb. for June. No May figure was given in the report.

Gamma isomer content of BHC for June was 407,406 lb., the Tariff Commission reported.

Production of urea during June was also somewhat off. Its total primary production of 100% urea basis, was 108,301,808 lb. in May, and only 93,868,049 lb. in June.

Fertilizer Tonnage Down in 1957-58, Annual Report Says

EDITOR'S NOTE

Some states have already issued reports on fertilizer sales during the fiscal year ended June 30, 1959. These show tremendous increases in tonnage in many important areas. Because the USDA report was delayed this year, it offers a quick comparison with current figures now being issued. See editorial on page 22, this issue.

WASHINGTON — A total of 22,515,763 tons of fertilizer was consumed in the United States, District of Columbia, Hawaii and Puerto Rico in the fertilizer year ended June 30, 1958, according to the annual report Aug. 25 by the U.S. Department of Agriculture. The total tonnage comprised 21,576,035 tons of products containing one or more of the primary nutrients and 939,728 tons of secondary and trace nutrient materials.

Consumption of fertilizers containing primary nutrients was below the 1956-57 total by 189,733 tons, or 0.9%, the report says. The quantity of secondary and trade nutrient materials was 3,515 tons, or 0.4% below that used in the previous year.

The annual report was compiled by Walter Scholl, Marion M. Davis, Esther I. Fox, and Anna W. Woodard of the fertilizer investigations research branch, soil and water conservation research division, Agricultural Research Service, USDA. Sources included information from manufacturers, fertilizer control officials, state agencies and fertilizer brokers. Special inquiries were made of all known distributors and custom applicators of anhydrous ammonia and nitrogen solutions, the authors state.

Changes in consumption of the classes of fertilizers containing primary nutrients in 1957-58 as compared with the previous year show that the national decrease in total consumption last year was due to a decrease of 349,784 tons (2.4%) of mixtures. This was partly offset by an increase of 160,051 tons (2.3%) of direct application materials. This was the fifth consecutive year since the peak of 1952-53 that the quantity of mixture has decreased.

The consumption of direct application materials, however, has increased annually except in 1952-53 and 1953-54. The decrease in total consumption was chiefly in the South Atlantic and East South Central regions. The consumption in the North Central, Mountain, and Pacific regions continued to make large gains.

As shown in table 3 (column 9), consumption of fertilizers containing primary nutrients increased in 27 and decreased in 23. In comparison with 1956-57 the increases ranged up to 55% (District of Columbia), while

(Turn to FERTILIZER USE, page 3)

AAI PRESIDENT SAYS . . .

Present Demand for Nitrogen Now Equal to National Output

ST. PAUL, MINN.—Some 200 registrants at the summer nitrogen conference conducted at the University of Minnesota here Aug. 28-29, were told that the demand for nitrogen has already caught up with the supply, and that "no excess supplies were left standing in railroad car pools during the first half of 1959." The speaker was S. C. Smith, Uvalde, Texas, president of the Agricultural Ammonia Institute, co-sponsor of the meeting with the soils department of the University of Minnesota and the Minnesota Agricultural Ammonia Assn.

Mr. Smith told his audience that some predictions had it that demand would catch up with the nitrogen supply about 1961, but the situation this year indicated that this time had already arrived.

Other speakers at the conference included representatives of the soils and extension departments of the University of Minnesota, a Minnesota farmer, representatives of the manufacturing industry, and fertilizer sales personnel.

Dr. William P. Martin, head of the department of soils, University of Minnesota, welcomed the visitors to the conference, and the opening session was in charge of Paul Lindholm, president of the Minnesota Anhydrous Ammonia Dealers' Assn.

In addition to stating that the demand for nitrogen had practically already met the supply, Mr. Smith reviewed the history of synthetic ammonia in the U.S., pointing out that overproduction was the keynote of the industry about 1955, "but gradual recognition of the worth of ammonia by farmers, induced by experiments in virtually every state, and by promotional

(Turn to NITROGEN, page 17)

More Sales, Better Fertilizer, Improved Agriculture Provide Theme for Alabama Conference

AUBURN, ALA. — Special reports on how to increase fertilizer sales, improve the state's agriculture and do a better job of formulating fertilizers were some of the highlights of the recent 1959 Alabama Fertilizer Conference.

More than 125 fertilizer industry representatives attended the sessions at the North Alabama Horticulture, Tennessee Valley and Upper Coastal Plain substations of the Alabama Polytechnic Institute Agricultural Experiment Station System and at the TVA Fertilizer and Munitions Development Center.

A major challenge to agriculture in the future is to keep land in production, declared Dr. J. T. Cope, Jr., experiment station associate agronomist, at the opening day's program. He said unless farm production is made profitable for farmers, they will leave the land and let it revert to less intensive uses.

The fertilizer industry can help in this campaign, the researcher said, by promoting the most effective utilization of its products. This will not only help agriculture, he explained, but also will aid the fertilizer industry as well. Since many factors affect response to fertilization, Dr. Cope said, it will pay the fertilizer industry to promote use of all good farm practices.

Because of the importance of fertilization on crop yields, Dr. Cope emphasized, it is important that the correct kind and amount of fertilizer be applied, and in the proper manner. This is necessary to prevent the lack of fertilizer from limiting yields, he

(Turn to CONFERENCE, page 8)

Inside You'll Find

Summers Purchases Minnesota Plant

BALTIMORE, MD.—Summers Fertilizer Co. has acquired Chemgro, Inc., Fergus Falls, Minn. James E. Totman, president of Summers, said the purchase involved the plant, equipment, inventory and trade mark. The operation will be under the general direction of W. A. Stolt, Summers' general manager of operations in the Dakotas. It will be designated as Chemgro Division of the Summers Fertilizer Co., Inc., Baltimore, Md., and will supplement the operations of Summers' plants at Sioux Falls, South Dakota and Grand Forks, North Dakota.

Chemgro was organized in 1955 with Messrs. B. F. Wolford as president and general manager and G. R. Lancaster, treasurer. The present management will become affiliated with Summers as co-managers of the local operation.

Chemgro manufactures double strength and complex fertilizers. Its equipment consists of the latest design, built around a T.V.A. continuous ammoniating unit, with an annual capacity of 15,000 tons.

Dr. K. M. Pretty

Potash Institute Names Canadian Director

WASHINGTON—Dr. Kenneth M. Pretty, of the Michigan State University soils science department, joined the American Potash Institute as Canadian director Sept. 1, Dr. H. B. Mann, president of the Potash Institute, has announced.

A specialist in soil nutrition problems, Dr. Pretty will serve all Canadian provinces—from Nova Scotia in the east to British Columbia in the west—administering the Institute's various services to the official agricultural advisors and fertilizer representatives of Canada. His offices will be in Burlington, Ontario.

Dr. Pretty is a native of Ontario, Canada. He was named first supervisor of the Middlesex County soil improvement program in 1951, after finishing Ontario Agricultural College as a leading agronomy student.

In 1954, he joined Michigan State University as graduate research assistant in the soil science department. Four years later he had earned both his M.S. and Ph.D. degrees in soil science, while teaching soil fertility to graduate students and conducting three or four major research projects.

Donations of Cash and Products Aid Research

BERKELEY, CAL.—A grant of $43,646 by the California Crop Improvement Assn. topped the donations to the division of agricultural sciences of the University of California last month for agricultural research. This gift is intended to support a research program designed to improve crop seeds.

An unusually large number of grants during the month were made by chemical firms in the form of products rather than cash. Among these were the American Cyanamid Co.; Chemagro Corp.; Colloidal Products Corp.; Food Machinery and Chemical Corp.; Hercules Powder Co.; Pennsalt Chemical Corp.; Rohm and Haas, all of whom contributed samples of their products toward a research project on walnut insect investigations.

Other contributing firms included the Stauffer Chemical Co.; E. I. du Pont de Nemours and Co.; Kaiser Aluminum and Chemical Sales, Inc.; Morongo Corp.; United Heckathorn; Dow Chemical Co., and Geigy Agricultural Chemicals.

Cash grants, in the minority during the month, were made by the following firms: California Spray-Chemical Corp., $3,000 for work on fundamental phosphate nutrition in plants; Chemagro Corp., $1,500 for research on systemic insecticides; Union Carbide Chemicals Co., $500 for research on insect pests of deciduous fruits; and California Fertilizer Assn., $413.90 for cereal crop fertilization research.

Ohio Pesticide Institute's Summer Tour Gives Visitors Lowdown on New Materials

WOOSTER, OHIO—Two new farm pests—one of cattle and one of corn—attracted major attention on the Aug. 11-12 summer tour of the Ohio Pesticide Institute, an annual event at the Ohio Agricultural Experiment Station. The two-day wagon tour to research plots and barns attracted 100, chiefly representatives of chemical companies.

Although the corn leaf aphid is not new in Ohio and other midwest states, it has snatched some of the farm headlines often reserved this time of year for the corn borer or earworm.

High populations of the lice have sent corn growers scurrying to telephones to call plane dusters. Thousands of acres of sweet and field corn have been dusted, chiefly with malathion, as a result of what Charles Triplehorn, entomologist, calls "mass hysteria" over the aphid. At the date of the meeting Ohio entomologists were advising farmers against spraying since the damage was already done. "Except for late-planted corn ready to burst into tassel, spraying would be a waste of money," they declared in a state-wide warning.

Mr. Triplehorn and his aides are making basic studies of the aphid which has been building up over the last three years, reaching a peak this year. By planting sorghum he gets an infestation in nearby corn about 10 days ahead of solid planted corn.

Systemic pesticides have shown promise, killing lice even while they were in the whorl. Another approach to the problem, however, may be use of hybrids carrying resistance to the lice.

OPI visitors were shown large swarms of flies swirling around the cattles' heads, like a living, black halo. Offhand, they looked like nothing more exciting than houseflies. Dr. Robert Treece explained that this pest is a new one to Ohio. It has tentatively been called the "face fly" for lack of a better common name. Since it has been reported in Ohio, other announcements have come in from New York, Illinois and Indiana.

Dr. Treece says the fly is in every section of Ohio, menacing not only cattle, but also horses and sheep. So far the commonly used fly killers have been ineffective against the pest. Farmers are told to leave barns or sheds open so cattle can escape the fly. The flies leave the cows as soon as they enter semi-darkness.

Dr. C. R. Cutright reported on the unusually big problem of European red mites in Ohio orchards this season. Hot, early spring days brought on an early egg hatch and growers were caught largely unprepared. Dr. Cutright said the materials to kill mites are available; the job is to get them on properly and on time. He pointed out that two sprays of half-strength will do a better job of killing the spiders than one spray at full strength.

Frank Winter, plant pathologist, reported that some apple fungicides improved apple set while others appeared to reduce it. While check trees had about 26 apples retained per cluster in late June, this set was improved by some sprays. Other fungicides reduced set to less than 15 apples per blossom cluster.

One of the most striking insecticidal developments on vegetables is the use of systemics as side dressings, J. P. Sleesman, entomologist, declared. It has worked out well in the battle against the Mexican bean beetle. A single application of systemics gave good protection through the first picking of beans.

Dr. J. D. Wilson's work with using oils on potatoes to control early and late blight still appears promising. When combined with tri-basic copper, the oils gave better protection than either alone. Oil apparently makes it more difficult for the fungus to enter the leaf, he pointed out.

Two Appointments by Nitrogen Division

NEW YORK—Appointments of Rein U. Mesdag and Dr. E. Peter Griffin as district agronomists for Allied Chemical's Nitrogen Division have been announced by M. E. Hunter, vice president in charge of sales for the division.

They will assist Midwestern customers, farmers and universities with their soil problems and studies.

Mr. Mesdag, who succeeds Dr. Harvey J. Stangel in the Omaha, Neb. area, will service 11 Midwestern states from his headquarters in Omaha. Dr. Stangel is now chief agronomist for Nitrogen Division.

Dr. Griffin, who succeeds Dale Friday, will reside in Westerville, Ohio and cover the remaining eastern half of the Midwest. He holds a B.S. degree from the University of Vermont and a doctorate degree in soils from Rutgers University.

Mr. Mesdag holds a B.S. and M.S. degree in soil fertility from South Dakota State College. Prior to coming with Nitrogen Division, he taught soils at the college.

Southern Weed Control Conference Planned

BILOXI, MISS.—The thirteenth annual Southern Weed Conference to be held in Biloxi, Miss., Jan. 20-22, 1960, will feature recent progress in the use of herbicides to control weeds in all phases of southern agriculture, according to V. S. Searcy of the Alabama Agricultural Experiment Station, Auburn, Ala., president. He said all phases of research and education in chemical weed control will be reviewed during the three-day meeting.

California's Use of Fertilizer Continues To Set New Records

SACRAMENTO, CAL.—Use of fertilizing materials in California continues to increase at a record rate.

Figures compiled by the state department of agriculture show sales of 485,672 tons of commercial fertilizers and 170,204 tons of agricultural minerals during the April-May-June quarter of 1959.

The totals for the fiscal year 1958-59 are 1,255,899 and 1,079,313 tons, respectively, of the two kinds of fertilizing materials. These are record high marks for both. Commercial fertilizers were up 11.5% and agricultural minerals were up 31.6% over 1957-58.

Robert Z. Rollins, chief of the department's bureau of chemistry, said that comparison of the tonnages reported for the recent quarter with those reported for the similar quarter last year shows marked increases in anhydrous ammonia, ammonia solutions, and ammonium sulphate.

Mr. Rollins pointed out that liquid products have been steadily increasing in popularity with California farmers. During the past three-month period, covered in the report, liquid products made up 47% of the total tonnage of commercial fertilizers. Ammonia solution 20-0-0 grade alone accounted for 183,000 tons during the quarter.

Gypsum, as always, continued to be the major agricultural mineral, and made up 91% of the total of 485,259 tons of these materials reported.

GATES APPOINTMENT

DENVER, COLO.—Thomas G. Paterson, Jr., Denver, purchasing agent of the Denver-based Gates Rubber Co., has been named director of purchases and traffic. The announcement was made by Harry Brown, vice president in charge of production services.

NAC Speakers Include Senator, Industry Leaders, Fish & Wildlife Representatives

WASHINGTON—The National Agricultural Chemicals Assn. has announced a tentative program for its 26th annual meeting to be held at the French Lick-Sheraton Hotel in French Lick, Ind., Oct. 21-23, 1959.

One of the highlights of this year's meeting will be a luncheon address by Sen. Everett Dirksen (R., Ill.), minority leader of the Senate. He will speak on the broad agricultural and economic problems of the country as they relate to the pesticide industry.

The three-day program also includes speakers on the advertising, promotion, and marketing phases of the industry; a panel discussion on pesticides-wildlife; and views on the problems of world pest control.

Present plans call for the presidential address by Jack V. Vernon, vice president, Food Machinery & Chemical Corp., New York, on the opening day; and two presentations on sales, marketing, advertising and promotion. These latter will be conducted by Robert S. Thompson, president, Thompson-Hayward Chemical Co., Kansas City, Mo., and L. F. Czufin, California Spray-Chemical Corp., Richmond, Cal.

A panel on wildlife has also been arranged under the direction of Jack Dreessen, NAC Assn. staff. Speakers are expected to include Walter W. Dykstra, Fish and Wildlife Service, U.S. Department of Agriculture, Washington; Clarence H. Hoffman, USDA, Beltsville, Md.; Dr. Charles Lincoln, University of Arkansas, Fayetteville, and a representative, as yet not announced, of one of the national wildlife conservation groups.

Sen. Dirksen will be the luncheon speaker on Wednesday, Oct. 21, according to advance plans.

The final day's program will include reports by NAC staff members,

Sen. Everett Dirksen

and a paper on world pest control developments by Dr. Herbert L. Haller, assistant to the administrator, Agricultural Research Service, USDA, Washington.

How new legislation affects the pesticide industry will be discussed by Joseph A. Noone, NAC Assn., and Justus Ward, U.S. Department of Agriculture.

Chairman of the general committee in charge of convention arrangements is Dr. Roger Roth, Velsicol Chemical Corp., Chicago. Committeemen are J. W. Starrett, Monsanto Chemical Co., St. Louis, Mo., and Dr. Richard Wellman, Union Carbide Chemicals Co., New York.

The annual banquet is scheduled for Thursday evening, Oct. 22.

FERTILIZER USE

(Continued from page 1)

the decrease ranged to 37% (Hawaii). In the areas showing increases, 669,995 tons (7.7%) more fertilizer was consumed, while in the areas showing decreases the consumption was 859,728 tons (6.6%) lower—resulting in a net decrease of 189,633 tons (0.9%). As in 1956-57, the tonnage was higher in most of the northern and western states and generally lower in the southeastern states.

Compared with the consumption in each six-month period of 1956-57, mixtures decreased 283,543 tons (7.6%) in the July-December period and 66,241 tons (0.6%) in the January-June period. Consumption of primary nutrient materials was higher by 138,249 tons (5.8%) and 21,802 tons (0.5%) in these periods, respectively.

Mixtures

In 1957-58 the total consumption of commercial mixtures amounted to 14,353,023 tons (table 3). There were 2,156 grades reported. In addition, over 500 mixtures, many of which are duplicated in the above total but were not reported by grades, were used in California and an unknown number was reported as miscellaneous tonnages in other states. Mixtures consumed in 1957-58 represented 63.7% of the quantity of all fertilizers compared with 64.7% for the preceding year.

The total consumption of mixtures was 349,784 tons (2.4%) lower than in 1956-57. In 1957-58, a cumulative increase of 213,141 tons (6.6%) of mixtures was shown for 23 areas and a decrease of 562,925 tons (4.9%) for 28 areas. Larger quantities were used in most of the states of the New England, West North Central, Mountain, and Pacific regions, while in the majority of the other areas the use was smaller than in the preceding year.

N-P-K mixtures (table 1) represented 90.2% of the total tonnage of mixtures, while the other types (N-P, P-K, N-K) accounted for 2.4%, 5.7%, and 1.7%, respectively. The N-P-K type comprised more than 80% of the tonnage of mixtures in all regions except the Mountain and Pacific. In these regions, N-P-K mixtures represented 53.5% and 77.3%, respectively, while the N-P type represented 45.6% and 21.3%, respectively.

Excluding Hawaii and Puerto Rico, 108 grades of mixtures were each used in quantities of 10,000 tons or more (table 4). These totaled 12,911,855 tons and accounted for 91.50% of the quantity of mixtures used in the designated areas. Other grades consumed in the same areas in individual amounts of 2,500 to 9,999 tons totaled 118 (625,380 tons, 4.43%), while those under 2,500 tons totaled 1,817 (204,304 tons, 1.44%). The balance (369,801 tons, 2.63%) represented mixtures not reported by grades.

Consumption of mixtures in Hawaii and Puerto Rico amounted to 241,683 tons in 145 grades. While many of the grades in Puerto Rico are similar to those used in some areas of the United States, most of those in Hawaii are designated in fractional numbers.

The 15 grades consumed in largest tonnages in 1957-58 in each of the regions are shown in table 5, together with the quantities for each state in the region. At least 11 of the grades in each area were among the 15 consumed in largest tonnages in the preceding year, but not always in the same relative order of tonnage. The principal grades in 1957-58 accounted for 50% or more of the total quantity of mixtures consumed in each of the states except California, Colorado, Florida, Kansas, Nebraska, North Dakota, Oregon, South Dakota, Washington, and Wyoming. In each of these states, except North Dakota, they represented 30 to 49% of the total.

The total tonnages of the 15 grades shown for the United States, excluding Hawaii and Puerto Rico, represented 61.3% of the tonnage of all mixtures. Nearly two-thirds of the tonnage was supplied by approximately one percent of the grades. As in the preceding year, the 5-10-10 grade was consumed in largest tonnage. The relative order of most of the other 14 grades was the same in 1957-58 as in 1956-57, except that the 3-9-6 grade was replaced by the 5-10-15 grade and the relative orders of the 5-20-20 and 3-12-12 grades and of the 4-10-7 and 2-12-12 grades were reversed.

The 5-10-10 and 4-12-12 grades consumed in the largest tonnages for the individual grades have nutrient ratios of 1:2:2 and 1:3:3. Mixtures having these ratios were also used in the largest total tonnages in 1957-58 (table 6). The cumulative tonnages of all grades reported in the 10 listed ratios accounted for 74.1% of the total use of mixtures in the United States (excluding Hawaii and Puerto Rico) in 1957-58.

The national weighted average of the primary nutrients contained in mixtures in 1957-58 was 5.96% N, 12.53% available P_2O_5, and 1.73% K_2O, a total of 30.22% (table 7). The corresponding values in the preceding year were 5.74, 12.36, 11.43 (revised), and 29.53% (revised). The proportionate increase was highest for N (3.83%), while that for available P_2O_5 was only 1.38%, and for K_2O 2.62%.

Compared with 1956-57, the average nitrogen content of all mixtures increased in each of 46 areas and decreased in 5. Available P_2O_5 increased or did not change in 32 areas and decreased in 19, while K_2O increased in 29 areas and decreased in 22. In 1957-58, the change to higher concentrations of primary nutrients in mixtures was largest for nitrogen in Hawaii and the New England, and West North Central regions and smallest in the Mountain and East South Central regions.

For available P_2O_5 the change was largest in Hawaii, Puerto Rico, and the Pacific region, and smallest in the South Atlantic and East South Central regions.

For K_2O, the change was largest in the Mountain and Pacific regions, and smallest in the New England and East North Central regions. The only regions in which the average concentrations of primary nutrients were below that of the preceding year were the West North Central (revised average, 18.76%) and West South Central for available P_2O_5 and in the West North Central for K_2O. The concentration of P_2O_5 was also lower in Hawaii and Puerto Rico.

Materials

In 1957-58, the total consumption of materials for direct application, including secondary and trace nutrient materials, amounted to 8,162,740 tons —36.3% of all fertilizers used, compared with 35.3% for the preceding year. The quantity of these materials was 156,536 tons (2.0%) more than that (8,006,204 tons) in 1956-57. The tonnages of the principal grades and products in 1957-58 are shown in tables 1 and 8, and the changes from the preceding year are summarized in table 9.

(Turn to FERTLIZER USE, page 18)

TABLE 1—Kinds of Fertilizer consumed in regions and United States Year ended June 30, 1958[1]

Tons

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Hawaii and Puerto Rico 2/	United States
MIXTURES: N-P-K	336,487	1,622,205	4,227,965	3,045,300	995,486	1,611,294	570,566	37,023	290,215	204,828	12,941,369
N-P	26	321	156	49,765	140,017	5,459	32,037	31,534	80,158	2,112	341,585
P-K	30,365	105,584	178,045	230,400	67,163	175,412	28,817	545	2,992	3,732	823,055
N-K	0	59	209,753	429	79	3,375	7	48	2,253	31,011	247,014
CHEMICAL NITROGEN MATERIALS											
Ammonia, anhydrous	0	2,485	25,175	57,151	139,082	51,832	139,927	42,754	124,256	772	583,434
Ammonia, aqua	0	0	846	2,261	9,401	46	7,844	26,937	289,640	28,087	365,062
Ammonium nitrate 3/	4,780	31,816	136,369	138,098	243,040	284,077	106,142	70,272	102,314	0	1,116,908
Ammonium nitrate-limestone mixtures	162	2,195	223,944	2,025	173	30,797	534	3,622	0	60	263,512
Ammonium sulfate	531	4,499	11,673	97,108	11,771	11,922	97,777	63,170	226,004	52,655	577,111
Calcium cyanamide	1,379	9,033	8,858	1,028	189	9,642	6,467	1,173	8,579	0	46,348
Calcium nitrate	2	2	10,118	115	0	146	132	11,960	34,788	111	57,374
Nitrogen solutions	904	3,692	83,748	59,373	82,673	9,420	22,686	5,668	56,382	0	324,546
Sodium nitrate	1,582	10,307	241,814	1,382	286	129,960	49,157	493	386	134	435,509
Urea	1,076	3,661	3,614	11,950	3,796	1,212	18,700	19,034	27,044	8,096	98,383
Other	234	2,214	872	2,805	600	37	472	976	980	0	9,190
NATURAL ORGANIC MATERIALS											
Blood, dried	3	29	35	0	0	0	0	19	2,170	0	2,256
Castor pomace	1,519	219	2,600	0	0	25	0	0	920	0	5,283
Compost 4/	476	505	0	7,176	4,049	0	2,342	370	1,920	0	16,838
Cottonseed meal 4/	6,517	183	1,502	0	0	5	0	0	30	0	8,237
Fish scrap, meal, emulsions	423	16	0	15	0	0	0	8	1,270	0	1,732
Manure, dried	4,630	13,732	4,215	7,804	4,383	1,157	2,619	2,190	261,786	0	302,516
Sewage sludge, activated	7,403	14,421	8,737	30,512	8,161	1,034	3,388	4,690	18,567	100	97,008
Sewage sludge, other	0	0	0	740	92	19	0	265	35,621	0	36,737
Tankage, animal	7	410	1	0	0	0	0	0	1,450	0	1,868
Tankage, process	3,366	7,751	3,779	397	1	0	0	0	0	10	15,304
Other	751	138	1,015	0	0	0	8	100	3,461	0	5,473
PHOSPHATE MATERIALS											
Ammonium phosphate: 11-48 5/	0	454	45	9,628	45,025	11	3,539	9,158	14,111	1,095	83,066
Ammonium phosphate: 13-39 5/	0	0	0	220	18,372	24	14,935	5,759	6,166	0	45,476
Ammonium phosphate sulfate: 16-20 5/	0	0	0	948	74,635	73	67,317	46,996	104,785	261	295,015
Ammonium phosphate nitrate: 27-14 5/	0	0	0	0	3,218	0	0	4,336	10,135	0	17,683
Ammoniated superphosphate 6/	0	0	37	0	0	0	0	0	3,012	0	3,049
Basic slag	0	0	18,900	0	0	122,000	3,322	0	0	0	144,222
Bonemeal: raw and steamed	1,469	4,115	1,260	1,925	243	307	386	2	1,902	0	11,609
Calcium metaphosphate	0	590	2,478	11,617	15,739	14,122	856	272	26	0	45,700
Diammonium phosphate: 21-53 5/	0	113	1,541	3,796	5,502	3,456	3,027	7,803	1,073	1,102	27,413
Phosphoric acid	0	0	0	0	0	0	1,611	10,781	10,675	0	23,067
Phosphate rock	274	7,492	18,204	564,983	215,208	8,968	16,414	80	824	2,804	835,251
Colloidal phosphate	0	80	317	1,383	3,120	7,649	2,915	120	710	0	16,294
Superphosphate: 18%	1,824	7,753	14,896	16,078	16,963	19,340	0	0	3,442	0	80,296
" 19%	6,556	50	9,276	0	14	105	0	8,766	67,173	0	91,940
" 20-22%	21,907	61,165	26,257	42,988	24,572	56,122	50,708	6,879	1,309	5,747	305,654
" 23-41%	50	0	0	3,499	636	0	577	1,771	29	0	6,562
" 42-44%	0	0	0	0	21,038	0	1	28,196	7,668	0	56,903
" 45%	1	887	120	24,384	40,540	700	19,899	38,523	16,188	2	141,184
" 46%	60	2,013	5,427	44,231	68,527	2,427	20,660	4,504	3,643	1,725	153,217
" 47-48%	0	25	158	4,389	1,981	3,046	1,775	4,745	0	0	16,119
" 49-52%	0	0	0	238	84	38	18	0	0	0	378
Other	256	0	2,845	0	0	577	0	0	69	0	3,747
POTASH MATERIALS											
Cotton hull ashes	318	0	0	0	0	0	0	0	0	0	318
Lime-potash mixtures 7/	0	91	20,957	0	0	6,280	0	0	0	0	27,328
Manure salts	0	5	324	0	0	0	28	0	0	0	357
Potassium chloride: 50%	152	219	354	4,198	299	326	561	140	145	0	6,394
" 60%	1,678	4,625	35,252	187,179	45,095	40,956	28,348	1,492	5,884	7,887	358,396
" magnesium sulfate	68	1,354	1,981	3,369	355	1,137	1,245	41	264	5	9,819
" sodium nitrate 5/	174	1	13,290	39	0	1,296	18	0	0	0	14,778
" sulfate	114	1,319	5,246	3,480	2	6,411	120	1,125	6,864	2,106	26,787
Other	4	14	2,659	1,116	0	0	441	0	127	0	4,361
TOTAL: PRIMARY NUTRIENT FERTILIZERS	437,528	1,927,842	5,566,853	4,675,462	2,311,604	2,622,210	1,336,344	504,340	1,839,470	354,382	21,576,035
SECONDARY & TRACE NUTRIENT MATERIALS											
Aluminum sulfate 4/	4	8	7	0	0	0	0	0	53	0	72
Borax 4/	47	165	337	193	49	418	25	0	630	0	1,864
Calcium sulfate (gypsum)	101	3,238	99,307	1,717	135	2,132	810	39,008	742,252	2	888,702
Copper sulfate 4/	0	64	208	36	0	1	1	0	202	0	512
Iron sulfate 4/	0	0	105	0	0	0	15	549	2,308	2,311	5,288
Magnesium sulfate 4/	28	250	114	33	0	0	3	5	64	717	614
Manganese sulfate 4/	2	134	0	57	430	0	1	0	43	0	669
Mixed minerals 8/	0	19	1,097	15	266	7	102	651	3,864	0	6,021
Sulfur: 25-99% S	7	32	195	1	38	2	3,281	1,585	16,409	0	21,550
Sulfuric acid: 40-93%	0	0	0	0	0	0	734	2,674	964	0	4,472
Zinc sulfate 4/	0	27	216	1	4	85	3	3	3,254	66	3,659
Other	0	0	31	107	0	0	0	2,235	3,932	0	6,305
SECONDARY & TRACE NUTRIENT MATERIALS	189	3,939	101,674	2,533	492	2,645	5,075	46,710	773,975	2,496	939,728
GRAND TOTAL	437,717	1,931,781	5,668,527	4,677,995	2,312,096	2,624,855	1,341,419	551,050	2,613,445	356,878	22,515,763

1/ Including 1,030 tons of 30-10-0 grade, 6,100 tons of calcium metaphosphate, 4,625 tons of diammonium phosphate, and 297 tons superphosphate (49%) distributed by Government agencies for test demonstrations. Does not include liming materials or the quantities of materials used for the manufacture of the indicated quantities of commercial mixtures. The primary plant nutrient content of mixtures is shown in table . 2/ Consumption in Alaska was not available. It is estimated to be not more than 2,000 tons. Consumption in U. S. possessions considered negligible. 3/ Minor quantities may have been used for other purposes than fertilizer. 4/ Distributed by manufacturers of fertilizers. 5/ Including quantities reported as mixtures. 6/ Additional quantities may have been reported by grade under mixtures. 7/ Additional quantities are given free to farmers for which no records are kept.

INSECT, PLANT DISEASE NOTES

Fire Ant Spray Is Termed Successful

LITTLE ROCK, ARK.—The Arkansas Plant Board reports that 24,364 acres of land were sprayed in Union County this year in an effort to eradicate fire ants which first invaded the region in 1957.

The aerial spraying was financed jointly by the plant pest control division of USDA, the Union County Quorum Court, State Plant Board and funds from the state's emergency fund.

The treatment, third in as many years, was made between May 27 and June 27, with all known infested areas of the county being sprayed thoroughly.

Plant Board officials said a state inspector and three federal field inspectors are stationed at El Dorado in an effort to keep close watch on any developments. They term the results as "highly successful."

Clover Nomophila Found In Ohio Alfalfa Fields

WOOSTER, OHIO—Ohio Agricultural Experiment Station entomologists have discovered clover Nomophila feeding on young alfalfa. At the Trumbull County experiment farm Dr. Robert Treese and aides observed damage to an alfalfa stand interplanted in corn. The extent of permanent injury is not yet known because part of the damaged plants will recover.

Although the clover Nomophila is a common insect, it has not been considered economically damaging in Ohio. Dr. C. R. Neiswander has seen it on corn but discounted it as a serious pest.

The range of the worm and the extent of the damage in Ohio is unknown. The insects are now mostly full grown and are entering or are ready to enter the pupal, or resting, stage. From this pupa emerges an inconspicuous brown moth.

Bollworm Causing Damage In North Carolina Cotton

RALEIGH, N.C.—Reports indicate that bollworms are causing considerable damage. They are most abundant in the replanting fields. Boll weevils are in the "migration" stage in all areas and are especially numerous in the late cotton.

Growers who have late fields will need to save as many squares as possible and try and keep the weevils from puncturing the young bolls. Growers can obtain the best results by following a regular schedule of treatment at 3 to 5 day intervals. It will require applications in some fields until early September.—George D. Jones.

Pink Bollworm Under Control, Texas Reports

CORPUS CHRISTI, TEXAS—One of the area's most troublesome cotton pests, the pink bollworm, has been slowed down considerably the last two years. This year the infestation was extremely light, according to Hugh Cavitt, head of USDA's plant pest control office here.

Mr. Cavitt attributes most of this to diligent control methods by farmers, which consists mostly of turning under the cotton stalks soon after harvest.

One problem in controlling the worms is where farmers leave a few stalks at the ends of rows. Also, okra plants provide good hibernating places for the worms, and farmers are urged to plow the plants under.

As the pink bollworms decreased in number, the boll weevils became more numerous. Mr. Cavitt said they became a serious problem as the season advanced, and had done quite a lot of damage.

Illinois Takes Steps to Stop Soybean Cyst Pest

SPRINGFIELD, ILL.—A ban on importation into Illinois of any farm products, machinery and other articles from Ballard County, Ky. has been ordered by Gov. William G. Stratton of Illinois. This step has been taken to prevent a possible outbreak of soybean cyst nematode. The quarantine is to remain in effect until further notice, the governor said.

The nematode has appeared in the Kentucky county and the Illinois official was concerned with protecting the soybean crop in Illinois, a large producer of soybeans.

The ban extended to soil, nursery stocks, bulbs, plants, root crops, used farm machinery, construction and maintenance equipment, burlap sacks and other farm product containers and other articles.

The nematode has hit a number of Southern states in recent years but has never been found in Illinois.

Wild Cherry Flies Cause Concern in California

SACRAMENTO, CAL.—An infestation of cherry fruit flies in Siskiyou County, particularly in the Mt. Shasta area, may result in a quarantine of cherries from that area next year.

A survey for other infestations already is underway in adjoining Shasta and Trinity counties after the flies spread from wild cherries to cultivated orchards in Siskiyou. Robert Klander, project leader of the California department of agriculture's bureau of entomology, said the heavy fly population was the result of mild conditions last winter.

Mr. Klander said the commercial crop on about 700 trees in the Mt. Shasta area was negligible and the bureau hoped to prevent the spread of flies to valley ranches.

The bureau will spray domestic trees for the next two years in the infested area. It is considered impossible to reach the wild cherry trees themselves. The wild cherry crop last year was one of the largest in 25 years and provided ideal conditions for hatching of larvae.

Spotted Alfalfa Aphid Appearing in California

BERKELEY, CAL.—After lying low during the last growing season, the spotted alfalfa aphid has begun some menacing activity this summer in certain northern California growing areas.

According to University of California specialists, a temporary slump in the "natural" phase of the University-developed integrated control system will probably bring the chemical phase into wider play this year.

This means that growers who follow the recommended practice will begin spraying whenever the pest population reaches 20 aphids per stem, says Kenneth Hagen, entomologist of the University's department of biological control.

The aphid story this year, Mr. Hagen explains, began with winter and early spring conditions resulting in low aphid populations in March and April.

Lady beetles and other natural aphid enemies found too little food and their numbers declined. This gave the spotted alfalfa aphid a chance to boom in some areas.

Screwworms Found in Two Southern States

WASHINGTON — Two herds containing screwworm-infested cattle have been found on both sides of the Mississippi River—one in the vicinity of Vicksburg, Miss., and the other near Tallulah, La., the U.S. Department of Agriculture reports.

Five animals were found to be affected. Screwworm specimens taken from infested wounds were positively identified.

The infested herd in Mississippi was immediately put under quarantine and sprayed with a pesticide to prevent spread of the pest, target of large-scale eradication campaigns in the southeastern United States. Additional state and federal workers have been assigned to the area to determine whether other nearby herds are affected.

Several localized infestations found last fall in the same region in Mississippi were held in check by similar procedures. The Tallulah infestation was the first in Louisiana livestock this year, and although this infestation lies outside the southeastern eradication area, the infested herd has been treated with a pesticide.

Persons in the Southeast engaged in handling livestock as well as all livestock owners on farms have been urged to watch for the appearance of screwworms in their animals, and to report any suspicious cases to the nearest county agent or veterinarian.

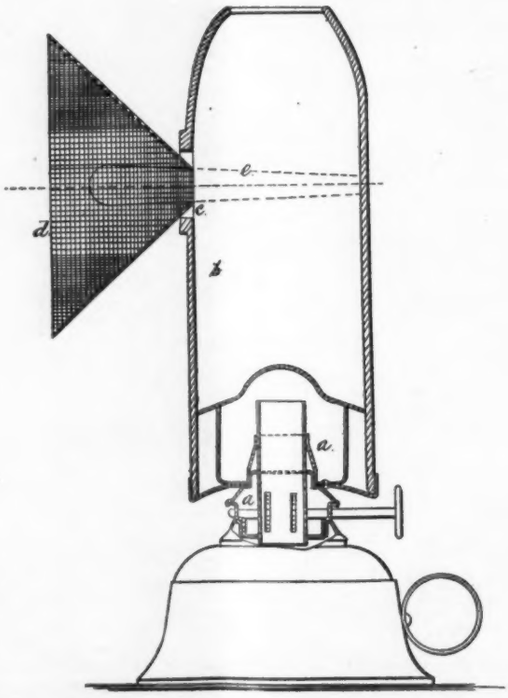
The Vicksburg find was the first positive identification of screwworms in the entire five-state southeastern eradication area this year outside of Florida. Only one infested animal has been found in Florida—on June 17—since late February, 1959.

In 1957, before the eradication campaign got underway, an estimated 30,000 to 40,000 cases monthly were found in Florida alone during the peak of the warm weather season.

The eradication campaign, a joint effort of Florida and USDA's Agricultural Research Service, with other southeastern states cooperating, has been in progress for 13 months. It involves mass rearing and dispersal from airplanes of billions of screwworm flies, made sterile by exposure to gamma rays of cobalt-60. Eggs from native female flies that mate with the sterile males are infertile. Continued release of sterile flies over an infested region reduces the native screwworm population until eradication results.

During last month, screwworms were found in a truckload of cattle at Memphis, Tenn. The animals were in transit from Texas to Montgomery, Ala. Another infestation among swine

Saga of Insect Pest Control



LANTERNS and other kerosene lamps seemed to hold fascination for 19th-century inventors whose creative thoughts ran to ways of destroying insect pests. Here is one such invention patented Jan. 25, 1870, by William H. Lewis of New York City. In his patent, the inventor observes that when insects are struck against wall, ceiling or furniture, they leave an "objectional stain."

His invention, however, bypasses such possibilities by attracting the unwanted bugs by light and thus luring them to their own destruction.

On the side of the lantern, he attached a funnel-like device through which the bug would enter the highly-heated area within the chimney, and there would die. Once inside the chamber, the draft of hot air would carry the insect out through the top, killing it in the process. "The heat destroys life instantly with small insects, or so injures larger ones that they die quickly," the patent claims.

COMRADES FIGHT BUGS

PEIPING, CHINA—Elderly people and children were mobilized recently by Communist China in an all-out effort to control unusually destructive numbers of locusts and other insect pests threatening crops in many portions of the country. Already hit by severe drouth conditions, the agricultural areas in several sections of China are described as being critical. The insect populations were said to be six times as numerous as they were last year.

The Communist Party newspaper "People's Daily" said all able bodied persons should concentrate on fighting the drouth while old folk and children should help combat insects in areas seriously stricken by both.

Some people were saying "if you want to overcome the drouth, you have no time to deal with insect pests," but this was a harmful view, the newspaper said.

The newspaper reported that insect pests were threatening middle season and late rice crops, and cotton-growing regions along the Yellow River Valley of north China.

in transit was discovered July 26 at the Delta, Miss., checking station.

Turf Insects Cause Trouble in New Jersey

NEW BRUNSWICK, N.J.—Chinch bugs and sod webworms are damaging turf in New Jersey.

Two Rutgers University extension specialists, C. Richard Skogley, who deals with turf management, and John L. Libby, entomologist, report that chinch bugs are especially troublesome on bent grass lawns, while sod webworms prefer new lawns but they also eat away at older ones.

Chinch bugs are black and seldom more than a fifth of an inch long. The young ones are reddish and even smaller.

Sod webworms are brown caterpillars about three-quarters of an inch long. In the moth stage, the insects fly above the ground surface in the evening.

Grasshoppers Plentiful, Kansas Report Indicates

MANHATTAN, KANSAS — Grasshoppers continue to be the most-represented insect. The heaviest numbers seem to be in western Kansas, despite a drop in numbers. In northwestern Kansas some grasshoppers still are in sorghum fields, and some wheat field margins are being treated before wheat is sown. In northeastern Kansas, grasshoppers have been eating pods off alfalfa seed crop.

One report from north central Kansas says essentially: Where control was used the past 2 years, very few hoppers now are present.

Both corn earworms and sorghum webworms were reported for the past week. In Oklahoma, counts have shown 34% of loose (open head) grain sorghums to be infested with corn earworms in one locality; some fields had 1 to 2 worms per head. Also in Oklahoma, counts of sorghum webworms ran 8 to 80 per head. Kansas had variable amounts: from less than 1% infestation to 25% loss of grain in neighboring fields in southeastern Kansas.

Boll Weevil Damage Heavy in Tennessee

KNOXVILLE, TENN.—Adult boll weevils are present in the southern counties in very large numbers. In practically all cases, all the squares are either gone or punctured. Square counts are of no value in the heavily infested fields. Migration is still taking place and control is needed to protect the bolls that are under two weeks old. Adult weevils should be moving further north into those fields that have not been infested so far this season. Cotton there is maturing fast enough that there will probably not be much damage from these weevils.

Large numbers of weevils in fields cannot be eliminated. However, heavy applications of insecticides at 3-4 day intervals will hold the numbers at the level present and aid in saving small bolls. Where large plants are involved, which are heavily fruited down low, tractors probably will cause too much injury. Airplanes would be needed. Saving one boll to the plant will pay for 4 to 5 insecticide applications.

Boll worms have not increased much but are causing some damage all over the cotton growing area. Control is needed in some cases.

Aphids are very light at this time. Heaviest in fields treated for boll weevils.—R. P. Mullett.

India Invites Bids For Over 242,000 Tons of Fertilizer

WASHINGTON — The government of India is inviting bids for over 242,000 long tons of agricultural chemicals, the Bureau of Foreign Commerce, U.S. Department of Commerce(reports.

Included in the supply invitation are 108,800 tons of ammonium sulphate, 41,800 tons of ammonium sulphate nitrate, 41,800 tons of calcium ammonium nitrate, 39,800 tons of urea and 10,000 tons of nitro phosphate. Shipment is required before Dec. 31.

Manufacturers and authorized suppliers should submit c and f and fob quotations by Sept. 9 to the secretary, Ministry of Works, Housing and Supply, Government of India, care of Central Secretariat, New Delhi.

R. W. Thatcher, DuPont Executive, Dies Aug. 26

WILMINGTON, DEL.—Richard Whitfield Thatcher, Sr., 57, sales manager of the industrial and biochemicals department of E. I. du Pont de Nemours & Co., died Aug. 26 at his summer home in Avalon, N.J.

Mr. Thatcher joined the DuPont company in 1929 as a salesman in the Chicago district of the former Grasselli chemicals department. In the latter part of 1948, he was promoted to sales manager for agricultural chemicals and in 1953 for industrial chemicals. He became sales manager for major accounts in 1957.

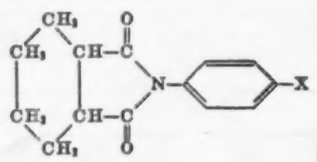
NEW FIRM

LITTLE ROCK, ARK.—The Conner Company, Inc., Augusta, Ark., has filed articles of incorporation with Arkansas Secretary of State C. G. Hall to operate an "agricultural and forestry business."

PATENTS and TRADEMARKS

2,900,243

Herbicides. Patent issued Aug. 18, 1959, to Norman J. Lewis, Kirkwood, Mo., assignor to Monsanto Chemical Co., St. Louis, Mo. A method of minimizing the preemergent germination of seeds and growth of plants thereof in agricultural soil which comprises applying to the soil from 2 to 15 pounds per acre of a compound having the structure:



wherein X is a halogen atom.

2,900,295

Method of Treating Nematodes with Thiourea and Substituted-Thiourea Copper Complexes. Patent issued Aug. 18, 1959, to Bobbie D. Stone, Miamisburg, Ohio, assignor to Monsanto Chemical Co., St. Louis, Mo. The method of controlling nematodes which comprises exposing said nematodes to a toxic quantity of a nematocidal composition comprising as an essential active ingredient a copper (I) complex selected from the class consisting of those having 1 to 3 molecules of thiourea per copper atom, 1 to 4 molecules of ethylenethiourea per copper atom, 1 to 3 molecules of phenylthiourea per copper atom, and 1 to 2 molecules of diphenylthiourea per copper atom, said ranges specified above being inclusive of the numbers mentioned and including fractional as well as integer intermediate numbers.

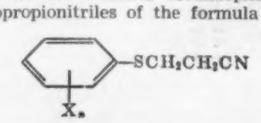
2,900,300

Method and Composition for Pacifying Bees. Patent issued Aug. 18, 1959, to Stewart R. Taylor, Oakwood, Ill. A composition of matter consisting essentially of a liquefied, normally gaseous, halogenated, low molecular weight hydrocarbon and a smoke-odor simulating component comprising from about 0.1% to about 10% by weight of a portion of the substantially anhydrous product of the destructive distillation of woody material which is soluble in said halogenated hydrocarbon.

A process for separating components having the pacifying effect on bees of the natural smoke of burning woody materials which comprises mixing a liquefied, normally gasecus, halogenated, low boiling hydrocarbon, having not more than two carbon atoms per molecule and containing at least one fluorine atom per molecule, with wood tar, separating the resultant solution from the insoluble portions of said tar, and maintaining said solution in liquid form.

2,900,409

Miticidal Nitriles. Patent issued Aug. 18, 1959, to Samuel Allen Heininger, Dayton, Ohio, and Eugene L. Ringwald, Decatur, Ala., assignors to Monsanto Chemical Co., St. Louis, Mo. Patent consists of halophenylthiopropionitriles of the formula



where X represents a halogen of molecular weight of from 30 to 80, and n represents an integer of from 1 to 5.

2,901,394

Fungicides. Patent issued Aug. 25, 1959, to Ronald Rosher, Wilmington, Del., assignor to Hercules Powder Co., Wilmington. A composition dispersible in water for inhibiting fungi growth which comprises a water-dispersible volatile organic solvent containing dissolved therein about 3-25% m-nitrophenacyl chloride.

2,901,393

Pesticides. Patent issued Aug. 25, 1959, to John M. Magner, Webster Groves, Mo., assignor to Monsanto Chemical Co., St. Louis, Mo. The method of destroying Mollusca which comprises contacting the organism in its environment with an aqueous dispersion of copper phthalate in the concentration range of 1-50 p.p.m.

Industry Trade Marks

The following trade marks were published in the Official Gazette of the U.S. Patent Office in compliance with section 12 (a) of the Trademark Act of 1946. Notice of opposition under section 13 may be filed within 30 days of publication in the Gazette. (See Rules 20.1 to 20.5.) As provided by Section 31 of the act, a fee of $25 must accompany each notice of opposition.

Marchon, in hand-lettered design within oval, for chemical compositions for use as wetting agents, emulsifiers, and phosphates. Filed Aug. 27, 1957, by Marchon Products, Ltd., London, England. First use, 1949; in commerce same year.

Rosy Future, in capital letters, for fertilizer. Filed March 10, 1959, by Olin Mathieson Chemical Corp., New York. First use Aug. 30, 1955.

Nitrodol, in capital letters, for fertilizer. Filed Feb. 12, 1959, by Norsk Hydro-Elektrisk Kvaelstofaktieselskab, Oslo, Norway. Owner of Norwegian Reg. No. 46,166, dated March 29, 1955.

Ferti-Start, in capital letters for fertilizer in dehydrated, concentrated, water-soluble form and in liquid form, for use in transplanting solutions. Filed Feb. 26, 1959, by Clover Chemical Co., Pittsburgh, Pa. First use Sept. 11, 1958.

BARLEY CROP UP

SACRAMENTO—With harvest almost complete and with yields and quality far above earlier expectations, California's barley crop is estimated at 1,661,000 tons or about 3% above last year.

CO-OPS MERGE

HILLSBORO, ORE.—Membership of the Tualatin Valley Co-operative here recently voted five to one to merge with the Washington Farmers Co-operative.

Ragweed Spray Program Completed in Oregon

SALEM, ORE.—Willamette Valley ragweed controls are wrapped up for the season—unless some new infestation comes to light. George Moose, state department of agriculture, assistant plant chief, says the last spraying of known infestations in this area is done.

One new valley infestation, less than 10 acres in carrots and corn on Ingram Island in Benton County, came to light August 18.

This ragweed was handpulled to avoid spray damage to the crops. Earlier in the season, another new infestation—about five acres in blueberries—was found in the Leaburg area of Lane County.

The department recently sent a second sprayer mounted on a jeep into Josephine County in an effort to clean up work on the large infestation in that county. One spray unit has operated in that county all season and the large spray rig has alternated between Josephine and other western Oregon areas.

Unless some infestation not now known comes to light in the upper western Oregon area, any ragweed pollen which develops must come from drift outside the area, Mr. Moose declares.

The 1957 legislature established the 18 western Oregon counties as a ragweed control area in which the state sprays infestation on private lands at no cost to the landowner. If the ragweed is in crops which sprays would damage, the state pays for hand pulling or some other method to effect a satisfactory kill.

Receives Conservation Citation at Meeting

RAPID CITY, S.D. — Santford Martin, editor, American Potash Institute, Washington, D.C., received a president's citation of the Soil Conservation Society of America at the organization's 14th annual meeting at Rapid City, S.D., Aug. 28.

Mr. Martin, a devoted conservationist, recently prepared an article entitled "And History Is Already Shining on Him," dealing with the life of Hugh H. Bennett, noted American soil conservationist.

Mr. Martin has also been active in the affairs of SCS, particularly in the Washington, D.C. chapter.

The Soil Conservation Society of America is an organization of over 9,500 members in 73 countries, dedicated to the development of the science and art of land and water management.

BIG TONNAGE

NEW ORLEANS—The port of New Orleans reports that it handled 816,233 tons of phosphate fertilizer material during 1958. It also handled 639,917 tons of industrial chemicals.

Lack of Complaints of Crop Damage Pleases Oregon Weed Supervisor

SALEM, ORE.—Ray Kelso, herbicide control supervisor, is keeping his fingers crossed because so far this year the state department of agriculture has received only three damage claims due to alleged losses resulting from use of chemical weed killers.

Last year 30 claims hit Mr. Kelso's desk. The lowest of any previous year was eight.

The supervisor is equally elated that so far this year no damage claim has involved drift of chemicals applied by any of the ground or air applicators licensed by the state. Last year, drift was one of the main causes of damages reported.

Mr. Kelso admits it's still possible the department may receive damage claims on 1959 spraying operations, but in the past few, if any, have been received after early September.

Under Oregon's herbicide application law, the department is authorized to receive and investigate claims from any landowners who believe their crops have been damaged by application of weed killing chemicals.

Dutch Elm Disease Survey Is Planned

OKLAHOMA CITY, OKLA. — The Oklahoma Department of Agriculture will make a survey in the South Coffeyville area of extreme northeast Oklahoma to determine if the Dutch Elm disease has moved into elm trees from Kansas.

Clyde Bower, head of the plant industry and entomology division, said field inspectors will start the survey shortly. He said Kansas authorities had notified him of the disease in trees at Coffeyville, Kan.

Mr. Bower said the disease had never been reported in Oklahoma and that he didn't "relish a program to combat it." He said the disease is hard to control, apparently accomplished only by spraying for bark beetle or by cutting the dead and affected trees.

Plant Dedication Scheduled in Idaho

MONTPELIER, IDA. — Dedication of the Central Farmers Fertilizer Company's Idaho Phosphate Works is scheduled Thursday, Sept. 10, at the site of the $16,000,000 plant here.

Dedication ceremonies will be supplemented by a day long schedule of activities beginning with the arrival of a special train from Denver at 6:30 a.m., carrying directors and shareholders of member groups and ending with its departure that evening at 8 p.m. from the Montpelier terminal. Some 300 guests are expected.

FDA Appointment

WASHINGTON—Dr. E. M. K. Geiling, former Frank P. Hixon, distinguished service professor of pharmacology at the University of Chicago, has been appointed to the scientific staff of the Food and Drug Administration, it was announced. Dr. Geiling will serve as medical officer and head of the pharmacodynamics branch of FDA's division of pharmacology.

CONFERENCE

(Continued from page 1)

explained. On the other hand, good farming practices are necessary to prevent their limiting yields below the level for which fertilizer is applied. A shortage of any one factor can limit yields to the point that all other factors are applied in excess and at excessive costs.

The agronomist told the group that crop yields in Alabama suffer more from a lack of soil moisture than from any other one factor. This is true despite an average rainfall of 50 or more inches annually, he explained, because of poor rainfall distribution and low moisture holding capacity of most Alabama soils.

While irrigation is the only effective means of avoiding drouth effects, high cost limits its use to high value crops. When the lack of moisture is removed as a limiting factor, the importance of supplying adequate fertility is increased, Dr. Cope said. He advised the fertilizer men to make a special effort to see that no farmer who goes to the expense of irrigation lets fertility limit his yields.

In a talk on soil test recommendations, Dr. R. D. Rouse, soil chemist in charge of the API's Station's Soil Testing Laboratory, stressed that recommendations are based on years of research at many locations in the state. He said three kinds of research information are used in arriving at specific recommendations.

First, he said, research is needed to determine what constitutes an adequate or inadequate level of available nutrient in the soil. When an analysis shows a certain amount of available nutrients, information must be available to tell if these amounts are low, medium or high in terms of adequacy for growth of crops. This information is available for the major soil types and major crops grown in the state.

Another kind of information needed is how much of fertilizer elements is needed to obtain maximum profitable response. This information is obtained from studies comparing yields at several rates of one element when the other elements are applied for maximum yields. This amount varies, depending on whether the farmer is using irrigation and all other factors at a maximum to shoot for best possible yields, Dr. Rouse said.

Maintaining soil fertility is the third point considered when making soil test recommendations. Since research has shown that it is profitable to maintain soil fertility, enough fertilizer must be used to keep fertility up as well as to produce good yields. In cases where fertility is low, soil test recommendations are higher than are general fertilizer recommendations, Dr. Rouse declared. However, if soil test shows a build-up in fertility, the soil test recommendations may be lower.

Recognition of the outstanding junior in agronomy at the API School of Agriculture came at the dinner meeting with presentation of the National Plant Food Institute achievement award to Troy Glen Dobbins of Long Island, Ala. Dr. W. H. Garman, Northeast director of the Institute, made the presentation.

The problem of losing nitrogen from the soil by leaching or into the atmosphere was discussed by Dr. C. E. Scarsbrook, station soil chemist. He said that until recently leaching was thought to be the major way that nitrogen was lost. However, he said, it has now been shown that large amounts may be lost to the atmosphere even in well aerated soils.

Dr. Scarsbrook cited results of tests where nitrogen was applied in the fall for crops to be planted the following spring. In some cases the fall application was as satisfactory as the same amount applied in the spring, both with ammonia and nitrate sources. But in other years at the same locations, nitrogen applied in the fall was lost before the spring-planted crops could use it, Dr. Scarsbrook said.

John Boseck, superintendent of the Tennessee Valley Substation, told the meeting that good possibilities for fertilizer sales could be realized by promoting use of fertilizer on pasture and hay crops. He said too much emphasis has been placed on use of fertilizer for row crops when the greatest potential is with the large acreage left after planting cotton and corn.

Proper fertilization and good management of forage and feed crops will allow the Tennessee Valley area to become an important livestock producing region, the superintendent said. In fact, he declared, the Tennessee Valley can compete with any section of the country if a good job of livestock production is done.

The work of TVA on development of new fertilizers and processes was related by Dr. J. H. Walthall, director of the Division of Chemical Development, during the session at Wilson Dam. He said an advantage of the research program is that work can be carried out on broad projects of potential value to the nation that are beyond the immediate interest or capacity of industry.

Dr. T. P. Hignett, chief of TVA's Applied Research Branch, described the agency's work in ammoniation and granulation of fertilizers. He said their interest in ammoniation was because of the economic advantage of using low-cost ammonia to supply nitrogen to mixed fertilizers.

In a study begun about 18 years ago, Dr. Hignett said, it was found that the common batch mixer was not efficient for obtaining a high degree of ammoniation, particularly when anhydrous ammonia was used to react with triple superphosphate. Research on this problem pointed to the need for a device in which the water vapor that is formed during the ammoniation reaction could be swept out of the mixer by air to keep the superphosphate dry enough to be free flowing, he said.

After some experimentation, the present type of continuous ammoniator evolved, Dr. Hignett said. It consists of a horizontal rotating drum containing a rolling bed of superphosphate, with ammonia injected under the surface of the bed. It was then found that a current of air flowing over the surface of the bed was sufficient to sweep out the water vapor and prevent stickiness of the superphosphate.

Growth of the liquid mixed fertilizer business despite problems in the manufacturing process was related by A. V. Slack of TVA's Applied Research Branch. He said that the low investment in plant equipment is the main advantage of liquid fertilizer production. The savings are offset to some extent, he explained, by the heavy investment in distribution and application equipment that many producers have found necessary to sell their product. This problem will diminish as farmers obtain application equipment or custom applicators set up to do business, he added.

Changes in agriculture and a review of field fertility work was the topic for T. S. Morow, superintendent of the North Alabama Horticulture Substation, and W. W. Cotney, superintendent of the Upper Coastal Plain Substation. Tours were conducted to show field research being done by the Agricultural Experiment Station.

The two-day conference was sponsored by the Agricultural Experiment Station and Extension Service of the Alabama Polytechnic Institute in cooperation with the Alabama Soil Fertility Society.

AT ALABAMA CONFERENCE—Shown discussing TVA fertilizer research and development work during the Wilson Dam session of the 1959 Alabama Fertilizer Conference in the top photo are, left to right, Dr. J. H. Walthall, director of TVA's Division of Chemical Development; Howard Parker, Sylacauga fertilizer dealer and member of State Board of Agriculture; Charlie Summerour, American Potash Institute, Montgomery, and Dr. E. V. Smith, dean and director of the API School of Agriculture and Agricultural Experiment Station.

In the center photo, Troy Glen Dobbins, center, API student in the School of Agriculture from Long Island, receives the National Plant Food Institute achievement award naming him the outstanding junior in agronomy at Auburn. Presentation was made by Dr. W. H. Garman, left, Northeast director of the Institute, Washington, D.C. Looking on at right is Dr. Howard T. Rogers, agronomy and soils department head, API School of Agriculture and Agricultural Experiment Station.

Shown below are representatives of three sponsoring agencies for the conference during program at the Tennessee Valley Substation, Belle Mina. Left to right are Dr. Howard T. Rogers, agronomy and soils department head, API Agricultural Experiment Station; Frank Boyd, southern agronomist, Virginia-Carolina Chemical Corp., Montgomery, president of the Alabama Soil Fertility Society, and J. C. Lowery, API Extension Service agronomist.

Colorado Agricultural Chemicals Group to Meet

DENVER, COLO.—The Colorado Agricultural Chemicals Assn. will conduct its annual meeting at the Cosmopolitan Hotel, Denver, Jan. 28-29, according to E. C. Stone, secretary-treasurer of the group.

The first of the two-day session will be a closed business meeting, Mr. Stone says, but the second day will be a joint meeting with the Colorado State Department of Agriculture and all interested officials of the State University at Ft. Collins. This latter meeting, on Jan. 29, will be an open session.

New Chemical Firm Launched in Utah

SALT LAKE CITY, UTAH—Amalgamated Chemical Co. has been incorporated, listing $100,000 capitalization, all of which has been subscribed. There will be no stock for sale. The firm holds approximately 50,000 acres in potash permits in southeastern Utah and southwestern Colorado, according to N. G. Morgan, Sr., president of the newly-formed firm.

Officers and directors include: Orval W. Adams, treasurer; Virgil V. Peterson, secretary; Louis Buchman, vice president, and Gus P. Backman, vice president.

Arkansas Dealer Caters to Fruit Growers: Successful Farm Chemical Store Develops

THE BROGDON Spray Supplies, Springdale, Ark., has specialized in sales and service of sprayers and the selling of chemicals to fruit and vegetable growers. The firm now sells to over three-fourths of these growers in a wide radius from Springdale.

By JESS BLAIR
Croplife Special Writer

"I decided to do something different from other store owners," is the way Dan Ingrum of Springdale, Ark., explains the success of his farm chemical store.

"When I bought the place from my uncle 12 years ago, everyone in town, it seemed, was selling seed and fertilizer. I saw an opportunity in working with fruit growers of this area—in providing them with all their chemicals by direct sale and through a rental spray service."

The firm carried the name of B. B. Brogdon, so he changed it only a little, and now it is known as the B. B. Brogdon Spray Supplies. Mr. Ingrum has a sizeable percentage of all this business in the Springdale area, and serves customers in a 100-mile radius. Some fruit growers in eastern Oklahoma and Missouri trade with him regularly.

He has become an authority on all kinds of fruits and vegetables. He knows the various insects and fungi and when to expect them. His advice on growing and harvesting methods is sought by dozens of orchardists.

A large part of the business is derived through his sprayer rental service. He has three large power sprayers which he rents at the daily rate of $6, $4 and $3, depending on which sprayer the grower wants.

"At one time we let producers use the sprayers free of charge," he said, "but it didn't prove successful. If

(Turn to SUCCESS STORE, page 15)

Mississippian Makes Farmer-to-Dealer Transition Pay Off in Big Profits

Four years after J. C. Mask quit farming near Corinth, Miss., his J. C. Mask Fertilizer Co. was selling 3,000 tons of fertilizer annually. In addition, the volume on insecticides amounted to 200 tons per year, and there were nice sales in herbicides and other chemicals.

Mr. Mask needed some kind of business after he got hurt and could no longer ride a tractor, so he decided a farm chemical store might afford him a living. This was something needed and also something in which he was vitally interested.

"There are not many fertilizer stores in the state," he said. "A lot of dealers sell fertilizer, but much of the time it is just a sideline."

Mr. Mask believes in getting a fair markup for his products. He gets a profit on every sack sold, and further, provides extra customer services.

"If you are sincere in wanting to help a farmer grow more cotton or corn, he won't quibble over the price," said Mr. Mask. "I've found that fertilizer seldom sells itself. The dealer must learn all he can about it, know the soils, crops and people of his area, then talk about fertilizer to every customer that comes in. Too often a farmer just neglects buying it, or else he waits until crop work is rushing, then doesn't take time to apply fertilizer."

Mr. Mask finds that fertilizer can be sold during the off-seasons. This is when he gets out on the farms and takes soil samples for the owners. When the analysis is returned from the state college laboratory, Mr. Mask goes over this with the farmer and often contracts for fertilizer well ahead of the season.

He finds that working with the county agricultural agent, ASC and Soil Conservation Service all pay off in good will, more knowledge of agriculture and in extra sales. Since the applications of fertilizer and lime are government approved conservation practices, farmers pay only part of the cost. This has increased fertilizer sales.

The farmer gets an order from the ASC but can buy the fertilizer wherever he chooses. Since Mr. Mask knows many of the farmers and has usually talked with them previously, he gets much of this business.

He has found that sales can often be promoted where none had existed before. Pasture fertilization, for instance, is relatively new. Very few farmers ever planned to fertilizer pasture land until someone talked to them about it and pointed out the advantages. Sale of fertilizer for pastures has been increasing the last two years, particularly on domesticated pasture crops from which hay is cut.

One stimulus to extra fertilizer sales has been a cooperative agreement with a contractor. Mr. Mask furnishes the materials while the contractor applies them to crop and pasture land.

"I like this arrangement better than if I had to do the application," he said. "I would need extra equipment and employees, but wouldn't be able to keep them busy many months a year."

The J. C. Mask Fertilizer Co. is housed in a large building beside the railroad. Nearly all fertilizer, insecticides and other chemicals are sent in by rail. Since he has plenty of storage room and is so close to the railroad, Mr. Mask has been gradually swinging more into the wholesale end of the business.

He is now selling to some of the farm co-op stores of the area and putting out fertilizer to small stores which handle it as a sideline.

"We are trying to build a large volume with as little labor and overhead as possible," he said. "By being lo-

(Turn to FARMER-DEALER, page 11)

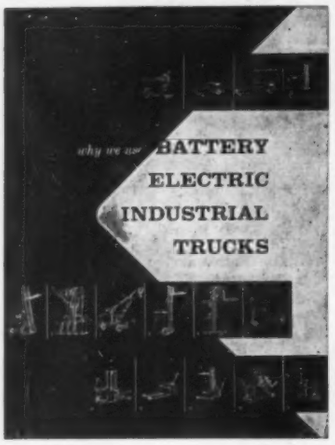
J. C. MASK, owner of the J. C. Mask Fertilizer Co., Corinth, Miss., is shown in warehouse of his firm. Sales volume is increasing, due to a specialized program to sell more farm chemicals.

WHAT'S NEW

IN PRODUCTS · SERVICES · LITERATURE

No. 6951—Industrial Truck Booklet

Major construction features and operating characteristics of a battery-powered industrial truck are contained in an 18-page booklet released by Electric Industrial Truck & Allied Products Manufacturers. The literature presents many quotations of what users have to say about the product. Title of the booklet is "Why



We Use Battery-Electric Industrial Trucks." A three-page section is devoted to the power source, batteries, chargers, motors and controls. A variety of safety features are listed. Interested persons can obtain copies by checking No. 6951 on the coupon and mailing to this publication.

No. 6950—Spreader Choice

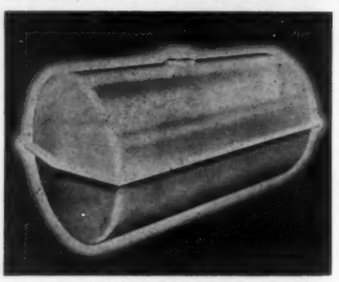
The "Challenger," a power-take-off driven lime and fertilizer spreader is now available with single spinner and 18 in. conveyor or double spinners and a 24 in. conveyor, announced Highway Equipment Co. The unit is a positive feed, self-unloading spreader. The conveyor and spinner system operates off the power-take-off. Body capacities range from 4.6 cu. yd. on the 9 ft. single spinner body to 8.8 cu. yd. on the 15 ft. double spinner model. More information including literature, complete specifications and name of distributors may be obtained by checking No. 6950 on the coupon and mailing.

Also Available

The following items have appeared in previous issues of Croplife. They are reprinted to help keep dealers on the regional circulation plan informed of "What's New."

No. 6937—Molded Tank

A molded fiber glass tank for use in spraying or storing corrosive liquids has been announced by the Molded Fiber Glass Body Co. De-



signed in a cylindrical shape, the 200-gal. tank is said to resist corrosion and weathering. It is recommended for use as a spray tank for insecticides and liquid fertilizers, or as a storage tank for chemicals. The tank is easy to clean, the company said, and is lightweight and impact resistant. It is 58 in. long with a 32 in. diameter. Available in a selection of colors, the tank is translucent so that the liquid is always visible. For more information check No. 6937 on the coupon and mail to this publication.

No. 6945—Warehouse Layout Brochure

"Warehouse Layout: Narrow Aisles or Wide?" is the subject of an eight-page brochure published by the Automatic Transportation Co. This brochure is designed as a guide for the best type of warehouse for individual installations. Four pages of Automatic equipment in operation illustrate certain ways to solve the narrow-wide aisle problem. For copies of the brochure, check No. 6945 on the coupon and mail.

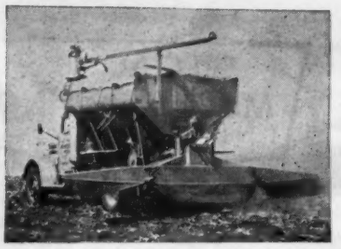
No. 6947—Handle Bag

Designed to lessen the load of carrying bulk packaged products in 25 lb., 40 lb., and 50 lb. multiwalls, the Hudson Pulp & Paper Corp. is pro-

ducing bags with side carrying handles. The construction of the handles provides for a pull of up to 250 lb., the company said. According to company literature, the handle bag was developed primarily because of the sharp rise in retail bulk packaging to increase saleability of the product and to lessen the handling cost to retailers. The handle feature encourages customers to carry home one or more packages. For details about the product check No. 6947 on the coupon and mail to this publication.

No. 6941—Feed, Fertilizer Body

A combination bulk feed and fertilizer body called the "Feedilizer," has been introduced by Simonsen Manufacturing Co. The 3,800 lb., all-steel body can give the dealer an extra fertilizer spreader during the rush season and it also can allow the dealer to expand his operation from the relatively short fertilizer spreading season to a full 12 months by adding bulk feed delivery, the company said. The Feedilizer is two complete bodies in one, with a total capacity of 261 cu. ft. The two compartments will hold 8½ tons of fertilizer or 5.2 tons of feed. This allows splitting a load into two separate orders of fertilizer at a time or separate feed or-



ders. One compartment can be filled with fertilizer and the other with feed. The unit has all the features of a bulk feed body and a spreader. Its feed delivery auger will reach 21 ft. bins, will turn 360° and will deliver feed at the rate of 800 lb. a minute. The fertilizer spreader unit is designed to spread accurately down to 75 lb. an acre. Because its apron is run by a wheel drive, the truck can be operated in all gears or with a two-speed axle without affecting the rate of fertilizer spread. Stainless steel is used at all critical points to reduce corrosion. For more information, check No. 6941 on the coupon and mail.

No. 6942—Cotton Pest Control Leaflet

Recommended procedures for the control of cotton pests are outlined in a new leaflet published by Stauffer Chemical Co. The leaflet describes the formulations of Trithion available, dosage recommendations and application methods for the control of two spotted mite, cinnabar mite, tropical mite, cotton aphid, leafworm and leaf perforator. Copies are available without charge by checking No. 6942 on the coupon and mailing to this publication.

No. 6943—Weed Killer Literature

Reasor-Hill Corp. has announced the availability of literature on the firm's granular weed killer, R-H Weed Rhap-20. The literature answers many questions, the company says, frequently asked about the product including what weeds it can kill, how to use and costs. A special portion on weeds in corn is contained. For copies of the literature, check No. 6943 on the coupon and mail.

No. 6949—Helicopter Spraying Booklet

Information about spraying, dusting and fogging by helicopter is discussed in a booklet recently released by Hiller Aircraft Corp. Photographs of the Hiller 12 E helicopters at work in the field, brief performance specifications and information on charger operator services are also also presented. Copies of the booklet, called "New Workhorse for Forest, Farm and Ranch," can be obtained by checking No. 6949 on the coupon and mailing.

No. 6944—Auto Leasing Study

A study for executives and financial officers, recently published by the Foundation for Management Research, analyzes the advantages and disadvantages of leasing auto fleets for company salesmen in cities and over-the-road. The 24-page study includes full charts on costs involved in different fleet plans, and is based on records covering 29,264 autos. The report is titled "Advantages and Disadvantages of Auto Fleet Leasing: A Comparison of Company Ownership, Salesman Ownership and Leasing." For copies, check No. 6944 on the coupon and mail.

No. 6938—Fly Killer

Camp Chemical Co. announced a new Diazinon Fly Bait Killer. In powder form, the product attracts flies and kills them, the company said. It is especially designed for out-

Send me information on the items marked:

- ☐ No. 6950—Spreader Choice
- ☐ No. 6951—Industrial Truck Booklet
- ☐ No. 6937—Molded Tank
- ☐ No. 6938—Fly Killer
- ☐ No. 6940—Spray Nozzle, Control Valve
- ☐ No. 6941—Feed, Fertilizer Body
- ☐ No. 6942—Cotton Pest Control Leaflet
- ☐ No. 6943—Weed Killer
- ☐ No. 6944—Auto Leasing Study
- ☐ No. 6945—Warehouse Layout Brochure
- ☐ No. 6947—Handle Bag
- ☐ No. 6948—Broadcasting Unit
- ☐ No. 6949—Helicopter Spraying Booklet

(PLEASE PRINT OR TYPE)

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COMPANY .....

ADDRESS .....

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door use. The company guarantees a 98% fly reduction each day of use. The package is ready for use merely by sprinkling on the ground or horizontal surfaces. The packages come 12 to the case. For information on this fly killer check No. 6938 on the coupon and mail to this publication.

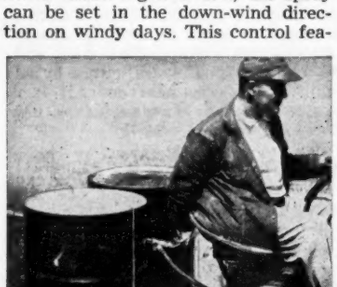
No. 6948—Broadcasting Unit

Larson Machine Co. announces a "Broad-Caster" for broadcasting pellet type fertilizer or small grains. A feature of the machine, according to the company, is a specially designed feed opening slide connection that

eliminates the need of disconnecting control parts when removing units. Opening, closing and adjusting are handled from one control within reach of the tractor seat. The feed slide control arms provide for adjustment on either side separately. A "Jabitator" agitator has been designed to reduce speed of motion so the fan shaft can be used for agitation to maintain a constant flow without causing violent churning of material. For more complete information about the product check No. 6948 on the coupon and mail.

No. 6940—Spray Nozzle, Control Valve

Spraying Systems Co. announces the DirectoJet, designed with a control valve that provides spray to either the left or right side of the tractor, or to both sides at one time as well as off-and-on control. The entire sequence of operations is controlled by the operator without leaving the tractor seat, the company said. Because the spray can be shut off to either right or left, the spray can be set in the down-wind direction on windy days. This control fea-



ture is also of advantage when spraying near fence rows or buildings. The unit is easily mounted on a tractor, with the control handle positioned convenient to the operator, company literature explained. Five different capacity ranges are available. The DirectoJet may be removed and used as an auxiliary spray gun. Check No. 6940 for details.

FORM CONTROL AREA

SACRAMENTO—A Johnson grass control area is being formed within the boundaries of the Orland Unit Water Users Association in northern Glenn County. The area will comprise 20,000 acres of private property, public utility land and state and county holdings. Earlier this year a weed control area was formed in the Codora-Princeton area of Glenn County.

FARMER-DEALER

(Continued from page 9)

cated right beside the railroad siding, I can often have a car set off for several days. This means we can help a farmer load his truck or pick-up right out of the box car. It eliminates double handling of the sacks."

He keeps his payroll down to a minimum by hiring only one regular employee. He occasionally picks up outside workers for loading and unloading, and pays them by the hour.

Most widely used fertilizers in this area are 6-8-8, 9-12-12, and 5-10-5, although there is a trend toward higher analysis materials. About four kinds of insecticides are used, while weed killers are just now getting started well in this area.

Mr. Mack has one delivery truck of three-fourths ton capacity which is used almost all the time. He will deliver fertilizer to nearby farms but encourages the farmers to haul their own. This is in keeping with his policy of streamlining operations, to sell more materials at less expense.

In addition to fertilizer, insecticides and herbicides, Mr. Mask sells a few farm supplies. He does not plan to get into general farm merchandising, however, because he feels that there is sufficient opportunity in the specialization of farm chemicals.

"A dealer can try to do too much," he said. "I add other items only when I see a definite need for them. One example is sprayers. When a farmer buys insecticides, he often needs a sprayer. Items such as these can be added a few at a time. In that way you will end up with related products that will sell readily, and not have a clutter of slow-moving stuff."

Livestock Raisers Told To Spray for Milkweed

SAN FRANCISCO — Various species of milkweed are proving so dangerous to sheep, especially, and other livestock in California, that livestock raisers are advised to use chemical and oil sprays on grazing fields to save the animals.

William H. Brooks, Mendocino County farm advisor, points out that 2,4-D and amino triazole will work successfully in destroying woolypod milkweed, the more toxic, and whorled milkweed. An oil spray on the weeds just before admitting the livestock to graze will kill the weed tops, he suggests, and will also act as a repellent to the animals, which will not touch the treated plants.

Leaf Miner Fly on Increase, Texas Reports

LUBBOCK, TEXAS — The leaf miner fly is damaging cotton fields for the first time since as far back as people can remember. These insects are usually present, says W. L. Owen, entomologist with the Lubbock experiment station, but have never built up in such damaging numbers until lately.

Mr. Owen says the flies make narrow, curved "mines" on the leaves to curtail the natural function of the plant. The insects retard the growth of the leaves, which is needed on late-planted cotton to mature before frost.

Though damage is difficult to estimate, since the flies do not eat the entire leaf, Mr. Owen says on some fields from 70 to 80% of the leaves appear to be affected.

Will Self-Service Boost Your Store's Profits?

By KENNETH A. GRUBB
Trundle Consultants, Inc., Cleveland, Ohio

A CHECK LIST is a graphic way of re-evaluating business methods. To test your own situation, put check marks on appropriate Yes or No lines below. Then look at the bottom of this page for your rating.

	Yes	No
1. Are you looking for a practical way of strengthening your competitive position?	....	....
2. Are you looking for a way to increase volume without raising fixed costs?	....	....
3. Have you read anything about the recent trends in merchandising methods?	....	....
4. Are many of your customers pressing for quicker service?	....	....
5. Have you noticed a loss of regular customers recently?	....	....
6. Does you present store layout cause bottlenecks?	....	....
7. Do you have ample floor space to handle your present and forecasted selling needs?	....	....
8. Have you been limited in adding new merchandising because of lack of space?	....	....
9. Do you find it easy to engage salespeople who really know how to sell?	....	....
10. Have your customers been ignoring your salespeople—and instead rummaging through your merchandise?	....	....
11. Do your customers frequently ask for help in making choices where you carry several different varieties of the same item or line?	....	....
12. Do you find that shoppers change their minds a lot?	....	....
13. Do your customers have widespread opportunities to make spur-of-the-moment (or impulse) buying purchases?	....	....
14. Have you found that one key to operating profitably is a large turn-over?	....	....
15. Have you checked up on recent figures to get a clear idea of the range of profit increase that changes in your selling methods can produce?	....	....
16. Do most of your items need further preparation, wrapping and marking before the customer takes them home?	....	....
17. Have you wondered why more and more goods come prepackaged, and include display and advertising material right on the package?	....	....
18. Do the majority of your lines involve non-standard, rarely advertised, unpackaged items?	....	....
19. Does your stock include such merchandise as food, hardware, drugs, notions and other relatively small-ticket items?	....	....
20. Do your customers include such people as busy housewives, young married working couples, men who do the shopping for the family?	....	....

A Quick Rating may be made as follows: If your answers are No to questions 3, 7, 9, 13, 15, 16, and 18, and are Yes to the others, it will be well worth your while to read on. Even if your final pattern of answers is somewhat different, you can probably expect some interesting and profitable surprises if you read the rest of the material in this story.

A quiet revolution has changed the face of the country's retail commerce. Although its success has been obvious, many small businessmen have not yet seen its implications for their own operations. As a result not a few of them sadly keep asking themselves this question: "Why is my cash register clanging less often now than in the past?"

A New Look at Self-Service. Those businessmen might well find the answer to their dollars-and-cents query in a merchandising feature which has their competitors' registers ringing lustily: Self-Service. Of course, as you well know, "S-S" (as some people in the trade call it) is not new. But in this past decade its growth has been phenomenal.

What does that mean to you? Simply this: If yours is a non-S-S operation, it is certainly worth your while to investigate the possibilities. Chances are that you'll discover it will boost profits; but on the other hand, investigation may show that in your particular line you may weaken your competitive position rather than strengthen it. Much depends on the kind of merchandise you sell and the type of clientele you have.

Self-Service and Small Business

Retail historians will tell you that as short a time ago as the early 1950's, S-S was still a healthy but relatively under-sized newcomer to retail operations. Few small retailers thought of adopting this commercial novelty. Wasn't it, they asked skeptically, a device for chain stores and other big operators? But as the commercial baby stubbornly grew up, it began to invade less-than-chain-sized operations, and gradually took hold in some segments of the small business community.

For instance, in the early part of this decade, probably less than one in ten drugstores offered its merchandise on a self-selection basis. By early 1959, an estimated one in three (including "independents") sold its goods that way. And, of course, new drugstores and other shops in recently-built shopping centers, operate on a part- or all-out S-S principle.

Other types of stores, too, have converted. Just a few years ago, only a handful of variety stores included any Self-Service features; today, on the estimate of specialists, one in three include such features. Supermarkets, of course, have long used Self-Service as a customer attraction; many of those built in recent years have adopted the central checkout system, which is one of three types of Self-Service.

Three Approaches to Self-Service. Broadly speaking, there are three main classifications of Self-Service. You will have to judge for yourself which fits best into your operation, keeping in mind the type of goods you will sell.

(1) Self-Selection. This is usually the first step away from complete service-by-personnel. In other words, the customer picks out his merchandise, then hands it over to a clerk for packaging and payment.

(2) Central Checkout. Choosing his own merchandise, the customer then takes it to a counter for packaging and payment. Typically, this is the way modern supermarkets operate.

(3) Vending Machine Operation. Used mostly at present as a supplement to other types of Self-Service operations, it is still in an early stage of development.

What Self-Service Can Do for You

At this point you may wonder: "But why should I bother to convert?" To that question, those businessmen—including small store managers—who have been in S-S for some time, reply: "Because chances are S-S will increase your profits." But there are other reasons, too.

For example, the average person today feels he already knows (from advertisements, magazines, labels, etc.) many of the answers to questions he formerly asked of sales clerks. Now, if a sales clerk breathes down his neck while he reads the label, he feels uncomfortable. If pressure or persuasion is tried he feels vaguely afraid.

The average person also likes to spend as little time as possible on shopping, and Self-Service can cut down that time. This is only true, of course, if your store has "signposts" which make it easy for customers to find the merchandise they are seeking. But there is another side to the S-S picture. Some customers, at least, object to having assigned to them such uninteresting duties as having to unload their shopping carts themselves. Customers may rebel against being made over into unpaid store clerks. Excessively long waits in the checkout line can also divert customers to competitive stores.

But, certainly, from the store's point of view, retail experts say, the result of conversion is that it will be able to take care of more customers than before, and yet labor costs will not go up. In other words, your current personnel will probably be able to take care of the increased store traffic, since it will not be selling directly to customers.

But unless you are already in S-S, you probably wonder if it's really true that it will make cash registers jingle more merrily than before. To find the answer to that question, and to some others concerning Self-Service operations, here is a brief run-down on some of the results which, many experts agree, follow in the wake of conversion.

The Profit Picture. As a rule, profits go up. One reason: Sales per square foot per employee, and sales per customer per store visit, rise. That rise often appears to be a substantial one. Fixed costs, generally speaking, do not increase with an increase in sales; thus every increase in sales above the break-even point yields more net profit than would a similar increase in non-Self-Service operations. A word of caution, however: Fixed costs may well go up in the early stages of "conversion," since you will probably have to add new merchandise and equipment.

The Variable Costs Picture. Self-Service is probably a good way of making the fullest use of those people whom you now employ. Because they will no longer have to spend most of their time selling, they may be able to work on displays, put more emphasis on keeping shelves stocked, gain experience in the new customer-and-personnel relationship. Their salaries—usually one of the biggest factors in a firm's variable costs picture (the other: merchandise)—will in effect become less of a burden to your budget. The reason: As sales increase, labor costs per dollar of sales will actually decrease.

The Sales Picture. Numerous experts estimate that conversion from total service-by-clerks to self-selection (notably in drugs and notions) frequently results in 50% increases of sales per clerk. The reason is obvious: Store personnel is less directly employed in selling, makes fuller use of time by giving information, packaging items customers buy, and acting as cashiers. A changeover from self-selection to central checkout, more than one specialist contends, may raise store sales by 5% a year (and store earnings anywhere from 5 to 10%).

The Space Picture. Because in an S-S operation, your clerks are no longer simply "sales people," you can save space throughout the store by making use of that part of the floor they formerly occupied. Thus, all at once you may find yourself with a 20 to 50% larger display area on your hands! And, according to some estimates, your sales per square foot may increase as much as 10%. Of course, some stores which convert may wish to add additional space, either by acquiring property next door, if it is available, or by moving into a new location.

The Payroll Picture. As noted earlier, S-S applied to the right situation will not only bring on new customers, but will also enable you to serve those customers with the personnel you now employ. As a result, your labor costs per dollar of sales decrease, and your profits are likely to rise. Payroll costs, according to some estimates, are currently increasing by about 1% of net sales per year in some retailing lines; gross margins, meanwhile, in these same lines, are holding steady or are even declining slightly.

The Personnel Picture. As a retail store owner you know that good salespeople can be one of the most valuable of a store's assets; but, nevertheless, they are an asset that is often hard to come by. In addition, one school of thought has it that the amazing success of S-S is partly due to customers' growing distaste for the poor service they usually get from indifferent, ignorant or incompetent sales personnel. Your own people may be good, but chances are that in that case they will contribute even more to the success of your enterprise in a Self-Service operation. For S-S store customers frequently want help and information, and this service your

SUMMARY

Have you wondered about converting your store to Self-Service? Many small business operators are thinking about it. Quite a few have already converted. While many have met with success, some have got into trouble. What is the attraction of Self-Service? As alert managers have found, consumers often prefer that type of operation, because it shortens the time they have to spend on shopping. When they have a choice between the older shopping methods and Self-Service, they favor the latter. From the store owner's point of view, S-S's attraction lies in its potential of higher profits. This stems partly from the fact that, generally speaking, its introduction does not result in higher fixed costs. Consequently, sales above the break-even point yield more net profit than would be the case in non-S-S operations. But don't jump to the conclusion that all merchandise can, so to speak, sell itself this way. It can't. In any case, as this Aid points out, know your merchandise and clientele. Be sure of their needs and preferences before you decide to change your selling ways.

employees must be able to perform satisfactorily.

Self-Service Factors

The idea of Self-Service may appeal to you. You may even want to get into the S-S swing yourself. But (you may want to know), "Can I convert just like that? And—should I convert?" The answer, of course, is not a simple Yes. There are some factors which you should consider before rushing headlong into a new sales world.

The Space Factor. In an earlier section, this Aid pointed out that by good management you may be able to increase your floor space anywhere from 20 to 50%. Having saved it, what do you do with it?

To begin with, you may want to use part of it for the display of additional merchandise. Another part you may want to set aside for the purpose of broadening the aisles along which customers pass to pick up items. Making the aisles broader will avoid the terrifying tempest caused by two women shopping cart drivers crashing head-on into each other, or creating a perilously polite precedence problem. A third use of new space: new shelves. In addition, you should remove all covers and fronts to merchandise storage spaces.

The "Advertising" Factor. No matter how much merchandise your store carries and how excellent in quality it may be, customers will stay away in droves if you don't have clear, conspicuous and concise "signposts" throughout the store. They must guide the customer easily to each group of merchandise, and to desired brands, sizes, styles and price ranges. A dash of color will help here, as it will your entire store. But bright colors and bold signs will matter little if semi-darkness forces the ill-fated customer to give an amateur imitation of Hollywood's Mr. Magoo, peering hopelessly into a dimly-lit world. So pay special attention to good lighting.

The Packaging Factor. One of your best allies in Self-Service management is packaging. Well-advertised, multi-colored, easily-identifiable, much of today's merchandise is a snap to find—even for the new customer. But, the arrangement of your merchandise should be logical—and

(Turn to **SELF SERVICE,** page 14)

OSCAR & PAT

By AL P. NELSON

The mid summer day was hot. In the Schoenfeld & McGillicuddy store, Tillie Mason sat typing slowly; balding, rotund Oscar was figuring costs, and Pat McGillicuddy was reading magazines and making notes. Outside the bulk fertilizer truck stood neglected, for most farmers do not spread fertilizer in late summer. The anhydrous applicators, too, were dusty, for they had not been used for several weeks as corn sidedressing was finished.

Inside the store, of course, customers came in now and then for weed killers and garden spray materials, but actually the "summer slump" was on, insofar as large volume was concerned.

Suddenly Pat McGillicuddy banged his fist on the desk and shouted. "Oscar, we are asleep at the switch!"

His voice and fist made so much racket that Ann Hydrous, the Maltese cat sleeping atop the safe, opened two eyes instead of one, as she usually did when there was a commotion.

"Maybe you are asleep, but not me!" Oscar said pointedly. "Ach, I haf been workink hardt on discounts while you—all you do is readt magazines. What kind of partner are you?"

Pat flushed a little, but did not allow the insult from his partner to throw him emotionally. "Well, Oscar, there must always be time in a business to think," he said slowly. "One can't fiddle away all his time with details."

"You think checking bills and quantities is fiddling, McGillicuddy?" Oscar snapped. "Or figuring discounts? Or keeping that delinquent list up to date—the one you don't collect on?"

"I'll get at it. I'll get at it." Pat was a little impatient. "But first listen to this, Oscar, and you'll feel like swinging into action to sell more fertilizer like I feel like doing."

"Sellink!" Oscar said—all his disdain for a sales minded person wrapped up in the way he said it.

"Here is a survey of the fertilizer sold in Wisconsin in 1958," Pat said. "I'm sure that the results just about parallel what's happened in Iowa."

"I don't belief anything I readt," Oscar said sharply. "Too many people lie."

"Don't be so suspicious of everybody," Pat said severely. "Believe a man right until he's proved wrong. Listen to this Wisconsin data. The use of fertilizer in Wisconsin increased 15.6% over 1957. In 1958, too, in that state the average plant food bought and used was 42 units, up from 35 units in 1954. What does that mean to you, Oscar?"

"Ach, they soldt lots of fertilizer, but didt they get paidt for it? If they didn't, lots of fertilizer dealers maybe went bust."

Pat shook his head in vexation. "In 1958, 21,000 tons of fertilizer were spread in bulk. The year before only 7,000 tons were bulk spread. That sure shows bulk spreading is taking hold in Wisconsin. The dealer with the spreader service gets the bulk business, Oscar. We made no mistake in buying that spreader truck two years ago."

"Ach, we shouldt have bought a used one, not a new one," Oscar growled. "We could have safed money."

"And listen to this, Oscar," Pat said a little excitedly. "In 1958 Wisconsin farmers spread 100,000 tons of fertilizer in the fall, compared with 377,000 in the spring. The previous year, only 58,000 tons were spread in the fall and 352,000 tons in the spring. Oscar, educating the farmer to buy in the fall and spread before plowdown is paying off. Those Wisconsin boys have done a good job. I imagine other states have, too.

"Yah, but how long did they haf to wait for their money? Ninety to 150 days like we haf to wait for some of ours?"

Pat shook his head. "No, this news report says that about half the farmers interviewed in an agricultural magazine survey said they paid for fertilizer on delivery, and the rest said they paid within 45 days."

"I don't belief it," Oscar said stubbornly. "But maybe they had a better collection manager than we haf. We couldt standt a new one—and quick." He shot a look at his partner.

Pat smiled a little sheepishly. "Oscar," he said earnestly, "I'll make a bargain with you. I'll promise to go out and collect overdue bills once a week, if you go along with me on an increased educational and advertising campaign to sell more fertilizer for fall application and plowdown. They do it in Wisconsin. We can do it here."

"Go along with you!" Oscar echoed critically. "I will neffer go along with you on more spendink and sales promotion. I will fight you all I can. Ach, that way I can hold you down to a respectable level. And I will nag you on the collections until you go oudt and make them regularly. And one of these days I will go out and collect myself."

"Heaven forbid!" Pat cried, remembering how tough Oscar talked to some farmers a year ago when he slipped out one afternoon in a rage to try to collect some money. "If you do I'll schedule an extra sales promotion when you are not here to watch me."

Oscar's suffused face had a frustrated look. "Ach, McGillicuddy, I am trapped with you. All I am thinkink to do is keep the money here when it comes in—not send it oudt on a spendink spree again. Can't you understand that?"

Pat thrust his head forward and glared, too, until both men looked like a couple of roosters with ruffled neck feathers ready to jump at each other.

"I understand a lot about you, Oscar. I know that you are a penny pinching fellow who doesn't care how the customer feels. All you think about is collecting from him what he owes us. You don't care if he ever comes back. You've never even tried to understand the meaning of good will. You think you can sell large amounts of fertilizer tonnage and farm chemicals just sitting here on our—our — — — and waiting for customers to come in and buy. But you have to go out and sell today. You have to—"

But Oscar had swung in his swivel chair and was working on his discounts again, his back toward Pat.

McGillicuddy stared at Oscar's back for a moment, then slammed his papers on the desk and strode from the door. He knew then, if he had not known it before, that it was about as easy to change Oscar's mind as to split the Rock of Gibraltar with a chisel.

N. Dakota Farm Chemical Company Builds Annual Volume by 'Knowing Farmer Needs'

Chemicals to the value of $500,000-$750,000 are distributed annually by R. F. Gunkleman & Sons of Fargo, N.D. The area covered includes Minnesota, North Dakota, and parts of Montana and South Dakota.

An important factor in developing this volume is "knowing the farmers' needs," says John Gunkleman, firm partner. "For this information we rely on the research of the manufacturers, and colleges, extension services, and our own staff. We have had excellent cooperation from the Minnesota and North Dakota agricultural colleges," Mr. Gunkleman says.

R. F. GUNKLEMAN & Sons of Fargo distribute chemicals up to a volume of $750,000 annually.

Our function, he continued, is to be aware of what the farmers' problems are, and what products are best suited to solving them. Part of the job is to develop new products when necessary.

"When our field men find problems of plant disease or insects, we all get our heads together to find the solution," he added.

The Gunkleman firm distributes insecticides, fungicides, seed disinfectants, grain fumigants, herbicides, and rodenticides.

Recent developments tend to specialization in the chemical field, Mr. Gunkleman said. He explained how "we have many all-purpose chemicals, but some specific problems still remain." An example is wild oats; up to now no chemical has been found that will kill this weed without killing other plants also.

Specialty crops in the area include potatoes and sugar beets, for which specific chemicals are needed. In the case of potatoes they include sprout inhibitors, and insect and disease controls. Sugar beets require control for webworms and wire worms, he said.

Mr. Gunkleman said that it is important to build up the trust of dealers and farmers. "To do this we must take responsibility for what we tell them—when to use a product, and when not to use it."

SULFUR PRODUCTION

WASHINGTON—The domestic sulfur industry produced 389,212 long tons of native sulfur and 56,964 tons of recovered sulfur (of a purity of 97% or greater) during May, according to reports of producers to the Bureau of Mines, U.S. Department of the Interior. Producers' stocks of native sulfur decreased from the previous month, and at the end of May totaled 4,155,945 tons.

FARM SERVICE DATA

EXTENSION SERVICE REPORTS

Both research and grower experience have shown that either two or three fertilizer applications per year are satisfactory under normal conditions in all citrus growing areas.

Scientists at the Florida Citrus Experiment Station say applications may be made in the fall, winter—and late spring, or any two of these times. Timing of fertilizer applications is less important than the total amount used per year.

The timing practice chosen should be followed consistently, as frequent changes may adversely influence the bearing habit of the trees.

Research has shown that citrus requires 15 different chemical elements for healthy growth. Twelve of these must come from the soil or from applied fertilizers, soil amendments, or nutrient sprays.

These are nitrogen, phosphorus, potassium, magnesium, manganese, copper, zinc, calcium, sulfur, boron, iron and molybdenum. All 12 of these essential elements are now being applied to some Florida citrus groves. The other three, carbon, hydrogen and oxygen are provided by air and water.

The best guide for determining the amount of fertilizer to use on bearing trees is the production capacity, based on yield records of the past several years.

Citrus will survive under a wide range of nutrient levels. It is impossible to outline a single fertilizer program that is better than all others for all conditions. A wide variety of programs is in use and many are producing high yields of good fruit.

Citrus specialists emphasize that the amount and quality of the fruit crop in any one year are not determined by the ratio of elements or the rates used in any single fertilizer application. They are influenced by all cultural practices previously carried out and environmental conditions of the past several years. These include insect and disease control, irrigation, soil condition, weather, and other factors in addition to fertilizer practices.

★

Although he spends twice as much as the average Georgia farmer on cotton fertilization and insect control, C. T. Fowler of Gordon County produces three times the average state yield.

W. H. Sell, agronomist for the University of Georgia Agricultural Extension Service, said recently that Mr. Fowler usually spends about $50 per acre for fertilizer and insecticides but the extra $25 he spends over the state average returns $150 to $200 worth of cotton.

John R. Gunnels, county agent, says Mr. Fowler has become one of the most efficient cotton producers in his area. For the past three years his per acre yields have been three times the state average. Last year he averaged 884 lb. of lint per acre on 38 acres and his three-year average is 1,008 lb. per acre.

Mr. Fowler believes in following soil test recommendations to determine the amount and analysis of fertilizer to use. In 1958 he used 1,200 lb. of 4-12-12 fertilizer and 75 lb. of nitrogen per acre. He planted his cotton in 42-in. rows.

This Gordon County farmer says the secret to insect control is to keep a close watch over the crop and, when the insect population builds up, poison every four or five days until insects are brought under control. Last year he made 13 applications of insecticides to control insects.

★

Fertilizers made from glass are now being used in Florida to prevent rapid leaching from the soil, according to H. W. Winsor, assistant chemist with the Florida Agricultural Experiment Station.

Mr. Winsor, who had been working with boron, studying the causes of its rapid leaching, searched for a less soluble form of the material. Other scientists were fighting the same problem.

After a nationwide search, silicates were deemed the nearest natural answer to the problem. But little of the material was found in natural glasses. Finally one company began making a glass fertilizer which contained one or two of the minor elements.

All six of the minor elements can be incorporated into this product, including boron, copper, iron, manganese, molybdenum and zinc.

According to Mr. Winsor, 25 to 50 lb. of the glass fertilizer, called frit, per acre has produced excellent results. Plants bloom freely, set seed heavily, and produce larger yields of higher quality plants when glass fertilizer is incorporated into usual fertilizer mix.

★

Fertilization goes a long way in the management of winter pastures, according to W. H. Gurley, extension service agronomist, who is advising farmers in Georgia to prepare now for fall and winter grazing.

Mr. Gurley said soil tests should be taken on winter pasture land plots just as on any other crop. Nitrogen is probably the limiting factor on most winter pastures in Georgia, Mr. Gurley believes. He thinks this nitrogen helps determine whether the farmer has winter or spring grazing most of the time.

General recommendations for fertilizer when no soil tests are taken are for 50 lb. of actual nitrogen at planting or when the plants come up, Mr. Gurley said. Then another 50 lb. should possibly be put on in January or February, depending on the amount of grazing needed.

Five hundred pounds of either 4-12-12 or 5-10-15 should be put under the winter crop at planting if soil tests have not been taken to give specific instructions, Mr. Gurley said.

★

Watermelon fertilizer tests indicated that fertilization had a major effect on number of marketable melons produced, with a minor effect upon fruit size.

So remarked Dr. G. A. Bradley and J. W. Fleming, associate horticulturists with the University of Arkansas Agricultural Experiment Station. They based their conclusions from tests conducted on Norfolk fine sandy soil in Hempstead County during 1956, 1957, and 1958.

A shortage of any of the major fertilizer elements tended to reduce sugar content of melons. When yields were not affected by fertilizer differences, sugar content was not affected. "Thus, providing adequate fertilizer for good yields assures good quality," Dr. Bradley and Mr. Fleming contend.

Sixty pounds of nitrogen an acre as 30 lb. under the row and 30 lb. sidedressed was adequate for good yields, they reported. For highest yields, it was necessary to apply 60 lb. of phosphorus and 30 to 60 lb. of potassium an acre in addition to the nitrogen.

Analyzing leaves for evaluating plant nutrient requirements was also studied. A high rate of predictive accuracy was possible with this method. The scientists stressed, however, that further investigations are necessary before practical fertilizer recommendations can be made from foliar analysis.

★

"Wherever you find a farm that has high milk production, chances are the farmer has fertilized his permanent pastures and has highly fertilized Sudan or millet for his cows," says W. R. Thompson, Mississippi extension agronomist.

In reporting on a recent tour of pastures throughout the state, Mr. Thompson named three things that had helped permanent pastures.

"The first is fertilization. On well fertilized pastures we found much better mixtures of clover or lespedeza and grass. The growth was much denser leaving little ground bare to the sun.

"The next thing we noticed was weed control. Some of the pastures had been sprayed in the spring and were still almost free of weeds. Some farmers had let the weeds grow early and then clipped them off. But these did not look as good as the ones that were clipped or sprayed early.

"Management was the third thing we noticed. It was easy to tell pastures that had been grazed down then rested and given a chance to grow back."

★

Results from a three-year field experiment conducted by H. D. Morris of the University of Georgia's college experiment station on Lloyd and Cecil sandy loam showed that split application of nitrogen is superior to application of all nitrogen at planting for oats grown for grain or grazing, or for combined grazing and grain.

Applying nitrogen to the oats in the middle of February when clipping was terminated provided enough nitrogen for rapid recovery of the vegetative growth and excellent yields of grain were obtained. Clipping up to Feb. 15 did not reduce grain yields when 50 lb. of N per acre were applied at termination of clipping.

The beneficial effect from split application of nitrogen was much greater during years with high rainfall than during years of low rainfall. Lodging of oats grown for grain was markedly influenced by grazing and time of nitrogen application in 1956 when yields averaged over 100 bushels per acre and in 1957 when disease and unfavorable climatic conditions prevailed at harvest time.

★

Two limiting factors in corn production in Georgia are the lack of adequate nitrogen and a shortage of plants per acre, according to extension service agronomists.

Many farmers use the proper amounts of fertilizer, but do not use the correct analysis, it was stated. Soil tests can help tell the farmer the best fertilizer for his individual soils.

The agronomists stated that some farmers use as much as 1,000 lb. of fertilizer under their corn and some 300 lb. of 33-0-0, yet produce only an average amount of corn. They say this is because many of them have only about 5,000 stalks per acre. The recommended amounts of stalks vary in the northern part of Georgia and the southern extreme. They vary from 8,000 to 10,000 plants per acre in south Georgia to 10,000 to 12,000 in north Georgia.

★

Soybeans and Ladino clover both benefited from liming loessial soil in the first year of tests conducted by the University of Arkansas' Agricultural Experiment Station.

Limestone applied at rates of four and eight tons per acre six weeks before planting significantly increased soybean yields at Marianna on acid loessial terrace soil (Richland silt loam) with initial pH of 4.9, reports Dr. C. D. Foy, U.S. Department of Agriculture soil scientist, and associates.

Fertilization was 250 lb. of 0-20-20 broadcast prior to planting and the same dosage placed in the row at planting time.

Four and eight tons of dolomitic and four tons of calcitic limestone produced 36, 35, and 37 bu. of soybeans an acre, respectively, while no-lime treatments yielded 31 bu. an acre.

For Ladino clover, dolomitic and calcitic limestone applied at rates of one to eight tons per acre six weeks before seeding in the fall of 1957 at Colt increased 1958 yields on loessial hill soil (Loring silt loam) with initial pH 5.1, Dr. Foy said.

Maximum yield was obtained with the two-ton liming rate, which averaged nearly 2,700 lb. of dry forage an acre from two cuttings compared with a little more than 1,900 lb. for non-limed plots. Fertilization was 1,000 lb. of 0-20-20 broadcast prior to planting.

The relationship between lime requirement and phosphate level of soils is receiving further study, remarked Dr. Foy.

APPOINTED COMMITTEEMAN

TRENTON, N.J.—Dr. Firman E. Bear of New Brunswick, retired chairman of the soils department at the New Jersey Agricultural Experiment Station, Rutgers University, has been appointed a member of the State Soil Conservation Committee. Dr. Bear was appointed by Gov. Robert B. Meyner and will serve as the governor's representative on the committee.

SELF SERVICE

(Continued from page 13)

items should well-displayed visibly ticketed, identified, and priced.

The Modernization Factor. Perhaps, while you are changing things anyway, you may also want to change the physical features of your store. You have two choices, of course. One, you can simply make a few alterations here and there (the need for good lighting, new shelves, new signs has been discussed); or you can do a complete modernization job.

The Management Factor. As an alert manager of a small retail establishment you already have a big job on your hands. In the top spot, you must perform many functions. Now you must add one more management chore: It is to train your current staff or find new personnel for the proper functions of clerks in Self-Service stores.

Self-Service Merchandising

What items lend themselves successfully to Self-Service selling? Already a large variety of goods are sold via one or the other Self-Service types of operation. Of course, as you will readily recognize, there are some limits to self-servicing.

Vending machines are being used largely for the sale of low-priced, standardized items such as tobacco, candy, hosiery, and a variety of hot and cold foods.

Self-Selection (at times combined

with a central checkout feature) now is used for the sale of television sets, men's and women's apparel, kitchen equipment and even large power tools designed for the home workshop.

Central Checkout is used mostly for pre-packaged items in the medium-to-low cost category; this is particularly true where these items are nationally advertised, so that they would include food, drugs, hardware, notions, some soft goods, electrical appliances.

"Please Wrap It Up." Imagine this picture: A mink-coated customer enters a small but exclusive dress shop. No one comes forward to greet her; she walks around the store, finally picks out a $150 creation. Carrying it to the checkout counter, she hands the dress across the desk to the busy sales clerk-cashier. "Please wrap it up," she says. A moment later she walks out into the street, carrying a $150 bundle under her arm.

Ridiculous? Of course. But this fairy-tale-in-reverse is intended to stress that not everything can be sold on a Self-Service basis. As was mentioned earlier, there are pitfalls in Self-Service, and jumping into it without proper preparation may weaken your competitive position.

Pilferage Problem. Experts say that a conversion to Self-Service adds very little to pilferage problems. Of course, they also largely agree that the problem would be far greater if small, easy-to-carry-off luxury items joined the Self-Service items list.

But pilferage is always a peril. Therefore, you may want to locate the manager's desk space, as well as checkout counters, at points from which it is relatively easy to survey the store.

To Convert—Or Not to Convert? Like automation, Self-Service can probably be carried too far. Before you conclude that Self-Service is the answer to your problem, consider your merchandise and clientele. Ask yourself: Will my merchandise "sell itself"?

SUCCESS STORE

(Continued from page 9)

people are getting them free, they are hesitant about bringing them back. After wearing out a $600 sprayer, we put on this rental fee and found that growers will gladly pay for it. They will also return them on time. Of course we sell all the materials and get full retail price for them."

Mr. Ingrum has the largest supply of sprayer parts in northern Arkansas. His inventory on sprayer parts alone averages more than $7,000. Just behind the cash register he has 400 small compartments filled with parts, with each one labeled and priced.

He handles two complete lines of sprayers. Both are good sprayers, he said, but some farmers prefer one kind and some another.

"If I handled only one brand," he explained, "many producers would be unable to get service on the other kind. So to serve everyone and keep this business from going elsewhere, we will continue with both lines."

Most of the large orchardists prefer to buy their sprayers from Mr. Ingrum, but the smaller growers usually use the rental system.

"A fellow with just a few acres of peaches or grapes can save money by renting," Mr. Ingrum pointed out. "If he bought a $1,000 sprayer, he probably wouldn't use it over eight or ten days a year."

DAN INGRUM, owner of the Brogdon Spray Supplies, Springdale, Ark., is shown standing in front of some of the 400 compartments that hold sprayer parts. Being able to supply parts and work on nearly every kind of sprayer known, he has built a thriving business with farmers, orchardists and vegetable growers.

One secret of his success lies in the amount of customer service he gives.. This is a land of diversified crops, and each one has its own following of insects and diseases.

"At first we had trouble keeping the right chemicals in stock," he said. "Insects often strike suddenly and 15 to 20 farmers would come to the store some morning wanting insecticides. Finally we solved this by anticipating which insect would strike."

The most effective way is to take numerous field trips and to set insect traps. Mr. Ingrum has many traps out in each type of crop, so when the catch starts increasing, he warns growers what to expect and lays in a supply of the proper chemicals.

Another way is to keep in close contact with the county agricultural agent, the fruit company specialists and the more experienced growers. He also follows all experiment station tests, receives large bundles of technical mail and makes this information available to his customers.

Mr. Ingrum has also spearheaded a movement to raise higher quality fruit. At one time growers could sell wormy apples and other fruit of inferior quality, but that day has passed.

"We've tried to stress the need of a complete chemical program," he said, "and I believe it has paid off—not only in increasing our business but in making a greater profit for the producer."

Mr. Ingrum has his large building divided into four parts. His combined waiting room, office and repair parts make up one section; the display room of sprayers and other merchandise is located just to one side, and back of this is the storage room. At the very rear of the building he has a repair shop where sprayers of all kinds may be serviced. This room has a large double door opening at the rear where the large sprayers can be wheeled in for service.

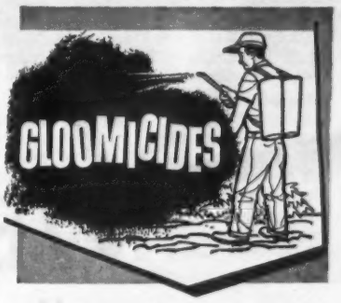
"To build a business in sprayers or similar kinds of equipment," he said, "a dealer must give a complete repair service. A man can lose a crop in just a few days when insects hit, so we try to repair those sprayers as quickly as possible. By having every part needed on almost any kind of sprayer, we can save the grower much time and build a lot of good will for ourselves."

In getting almost a monopoly on such trade, some store owner might be tempted to raise prices higher than usual. Mr. Ingrum makes a legitimate profit on every sale and every job, but keeps his prices reasonable. Every customer is given the same courteous and efficient treatment, whether he has a dozen peach trees or a 100-acre orchard.

When a customer rents a sprayer, it is inspected by Mr. Ingrum or one of his two experienced employees, filled with the proper chemicals and hauled to the farm. Or if the farmer wishes he may haul it out himself. Usually he returns it, but if this is impractical, Mr. Ingrum sends out a truck for the sprayer.

Most orders are taken by telephone, and exact routing is kept of the sprayers so that the next farmer can get it immediately. If the man has never operated one, Mr. Ingrum has an employee put the sprayer in operation at the farm and show the farmer exactly how to proceed from that point.

"One other thing I'd like to point out," said Mr. Ingrum, "is that the main thing is service. Unless we can help that man increase his yield and produce a better product, then our services would not be needed. The whole business is geared to this idea, and if we ever become more interested in making a profit than in helping our customers, then we wouldn't last one season. Helping others make more money will usually bring a little of it back to us."



"The weather here in Florida is so wonderful," said the old lady, "how do you tell summer from winter?"

Replied the hotel clerk, "In winter we get Cadillacs, Lincolns and stuffed shirts. In summer we get Chevrolets, Fords and stuffed shorts."

★

There is no greater satisfaction than parking on what is left of the other fellow's nickel.

★

Feed store: The only place in town where you can get a chicken dinner for 10¢.

★

He: Shall we sit in the parlor?
She: No, I'm tired. Let's play tennis.

★

Waitress: "We have everything on the menu today, sir."
Man: "So I see. How about a clean one?"

★

Bars are something which, if you go into too many of, you are apt to come out singing a few of, and maybe land behind some of.

★

News item in an Iowa newspaper: "Local police are puzzled over the finding of a car parked in a lonely neighborhood containing a full case of Scotch whiskey. So far they have found no trace of the owner, but Captain Grady is working hard on the case."

★

"I'm not wealthy and I don't have a yacht and a convertible like Jerome Green," apologized the suitor. "But, I love you."

"And I love you, too," replied the girl. "But tell me more about Jerome."

★

If you are rich, and drink, you're an alcoholic. But, if you're poor, and drink, you're a drunk.

★

Steno: I have an awful cold in my head.
Boss: Well, that's something.

★

A ragged tramp entered the doctor's office. He looked worried. "Doc," he said, "you've got to help me. I swallowed a quarter three years ago."

"Good heavens, man!" exclaimed the doctor. "Why didn't you come to me sooner?"

"Well, to tell the truth," replied the bum, "I didn't need the money until now."

★

"John," said the woman to her slightly flushed husband as they left a large cocktail soiree where he had been the life of the party, "did anyone ever tell you how fascinating—how romantic—how handsome you are?"

The man looked at his wife, pleased. "Why, no, dear, I don't think anyone ever did."

"Well," she snapped, "then where did you ever get the idea?"

★

"Clothes," explained the tailor, "don't necessarily make the man, but a good suit has made many a lawyer."

WEED OF THE WEEK

Mr. Dealer—Cut out this page for your bulletin board

Perennial Ragweed

(Ambrosia psilostachya)

How to Identify

The plant stems stand erect, usually less than 20 inches tall, heavily branched, with alternate or opposite leaves. Stems are rather stout, branched, hairy and, when mature, become woody. Leaves are light green in color, and about three or four inches long, divided into numerous parts.

Characteristics of Ragweed

This weed reproduces by seed and underground rootstocks. It is found in waste places, pastures, meadows, and by roadsides. It resembles common ragweed in appearance, but has a perennial root and a shorter, less bushy stem.

Damage Done by Ragweed

The abundance of yellow pollen produced by the plant is a prime cause of hay fever in human beings. To anyone thus afflicted, all other of the plant's shortcomings are inconsequential. However, ragweed is an unsightly, persistent plant which infests meadows and pastures and tends to take over complete areas where it chokes out other more valuable vegetation. However, it is not troublesome in cultivated land.

Control of Ragweed

Fortunately, ragweed is susceptible to the action of 2,4-D, 2,4,5-T and other chemicals which have been successful in practically eradicating it from certain small areas. Community drives toward eliminating this hay fever-inducing plant from cities, towns and counties have been largely successful. Vacant lots in cities when sprayed with herbicides, cease to be public health menaces as far as ragweed is concerned.

Illustration of Ragweed furnished through the courtesy of the U.S Department of Agriculture.

NITROGEN

(Continued from page 1)

work such as that accomplished by the AAI . . . demand has approached near to productive capacity again."

The president declared that ammonia, applied adequately in conjunction with other plant foods, is getting results which many crop specialists five years ago would have thought impossible. "Balanced fertility must be maintained. That is one of the strong planks in the Institute's platform, but once that fertility level is reached, then nitrogen is the limiting factor in most cases . . . and ammonia can add more food to the nation's market basket, more dollars to our total agricultural economy, than any other modern farm innovation."

He said that nitrogen means dollars for farmers and dollars for distributors. He added that dollars spent for research in the forms of grants, scholarships and greater help for agricultural teachers and researchers, would reverse a trend away from supplying needed personnel in agriculture. "The agricultural revolution demands more knowledge in agriculture. That is basic. This is a problem to which all of us must address ourselves continuously," he said.

Mr. Smith said the nitrogen picture is one of sound promotional policies; a picture of results which the American farmer gets from his fertilizer investment. "It is a picture of increasing acceptance of a basically sound product, and it is a marriage of American know-how and American agricultural ingenuity. Ammonia, properly handled, properly applied and in recommended amounts, can be a blue-chip investment all along the line," the president concluded.

Curtis J. Overdahl, University of Minnesota soils extension, in his talk on nitrogen carryover, said that the extent of benefit carried into the next year's crop depends upon a number of factors. These include the texture of the soil, its organic level, the level of phosphate and potassium, the rainfall of the area in the current and preceding year, other weather conditions, and the rates at which the nitrogen may have been applied. The greater the amount applied, the more carryover there will be, he reminded.

Dr. Paul Burson, soils department, University of Minnesota, stressed the necessity of maintaining a balance of nitrogen, phosphate and potash in the soil, since without adequate amounts of the latter two, the addition of nitrogen may not bring desired results.

Dr. Burson said that the role of fertilizer in over-all soil management is particularly important in erosion control, and with it, drainage of land. He expressed the belief that if as much had been known about nitrogen in the 1930's as is known presently about the element, agriculture would be twice as far along in soil management practices than it is today.

Lowell Hanson, also of the university, reminded his hearers that pastures should be regarded as a crop and that good pasture can pay off in producing total digestive nutrients for livestock. Advantages of fertilizing grass for pasture include the fact that it is already on hand and does not require seeding, it has early growth, presents less of a bloat problem, and is palatable and tasty to the animals.

A Minnesota farmer, Les Boler, Truman, Minn., showed moving pictures of some of his fertilization operations with anhydrous ammonia. His comment was that it is not a question of whether nitrogen will be applied on his farm, but merely a matter of how much. His soil is naturally high in P and K, he said, and nitrogen up to 178 lb. an acre gives optimum results.

The good fertility practices, he said, enable the farm to hold all water. The soil has no cracks in it despite a dry spell. He also has no water ponds on his farm, feeling that such are unnecessary.

Anhydrous ammonia is applied at plowing time, he said. Band application of fertilizer makes less of a weed problem than does broadcast application, since the weeds are just as eager to seize plant nutrients as is the crop, banding of the nutrients gives the unwanted plants less opportunity to steal the plant food.

The group took a field tour to demonstration plots in Washington County, Minn. and partook of an outdoor dinner at O'Brian State Park on the St. Croix River, Friday night.

Jack F. Criswell, executive secretary of the AAI, presided at the final sessions Saturday morning.

R. W. Scanlan, Phillips Petroleum Co., Bartlesville, Okla., described the importance of "keeping the customer satisfied through service," pointing out that a successful business in fertilizers consists of more than merely selling goods. By its very nature, nitrogen sales must be accompanied by helpful guidance on the part of the seller, so farmers may obtain encouraging results and sound profit from their investments in fertilizers.

Prof. J. M. MacGregor of the soils department, told the group that nitrogen for farm crops has the same beneficial results regardless of its form. Liquid ammonia, ammonium nitrate, urea and other forms are all equally effective when properly applied, he said. The important thing is for a farmer to know how many pounds of nitrogen is being applied.

Other misconceptions of farmers concerning nitrogen were pointed out by Prof. MacGregor. These included:

1. Despite opposite opinions, it does pay to add as much as 100 lb. actual nitrogen an acre to corn—if the crop follows a non-legume, is on heavy land and there are enough plants on each acre. On the other hand, nitrogen may not help at all if the plant population is too low. Minimum popu-

(Turn to NITROGEN, page 20)

FERTILIZER USE

(Continued from page 3)

Compared with the previous year, the chemical nitrogen materials and the natural organic materials were consumed in larger amounts, while the use of phosphate, potash, and secondary and trace nutrient materials decreased. The changes in consumption of chemical nitrogen, natural organic, and phosphate materials followed the general patterns of the past 5 years. The decreased consumption of potash materials was a reversal of the pattern.

The increase in the consumption of chemical nitrogen materials was due largely to greater use of anhydrous ammonia, nitrogen solutions, and ammonium sulfate. The larger tonnages of these materials together with increases in ammonium nitrate and other chemical nitrogen products, more than offset the decreased tonnages of ammonia nitrate-limestone mixtures, sodium nitrate, and urea. The percentage increases in the East North Central region, the West North Central (43.5%), West South Central (32.2%), and Mountain (30.4%) regions were all above the national increase of 28.9%.

The total consumption of nitrogen solutions and aqua ammonia was 9.9% higher in 1957-58; the increase was only 4.4% in the Pacific region, the area of greatest use, but more than 50% in the New England, East North Central, West North Central, and East South Central regions. On the other hand, the use of such materials decreased greatly in Hawaii, owing to labor troubles on the sugar plantations.

The change in consumption of ammonium sulfate ranged from a decrease of 34.2% in Hawaii to an increase of 111.8% in the East South Central region; total use was 11.8% higher than for the preceding year. While these extremes were in areas using relatively small tonnages, the regions of principal consumption showed increases of 5.4% (East North Central), 8.8% (Pacific), 12.4% (Mountain), and 29.2% (West South Central).

The total uses of ammonium nitrate-limestone mixtures and sodium nitrate decreased 12.3% and 11.7%, respectively, in 1957-58. These decreases were mostly in the South Atlantic and East South Central regions, the areas of principal use, in which the total tonnages of fertilizers have generally decreased over the past several years. The use of urea decreased 9.7% and was generally lower in most of the tabulated areas.

Consumption of the principal natural organic products (composts, dried manures, sewage sludges) was only a little higher in 1957-58, while the use of most of the other products in this category was generally lower than in the preceding year.

The total consumption of phosphate materials decreased 12,118 tons (0.5%) from that in 1956-57. The principal change was in the use of colloidal phosphate and phosphate rock, an increase of 15,362 tons (1.8%). The use of superphosphates (22% grades and under) decreased 82,108 tons (14.7%); the consumption in each of 41 areas was lower than in 1956-57. Although the use of grades of superphosphate containing over 22% P_2O_5 was lower in 27 areas, the increases in the other areas were sufficient to give a slightly higher net total (394 tons, 0.1%).

Among the other phosphate materials, the 11-48, 16-20, 27-14, and 21-53 grades of ammoniated phosphates (table 10) were the principal products consumed in increased amounts. The tonnages of those materials were notably higher in most states of the West North Central, West South Central, Mountain, and

AIR APPLICATOR—A new type of agricultural airplane, known as the Ag-2, has been announced by Transland Aircraft, Torrance, Cal. Shown here dusting cotton for mites and lygus control, the craft is carrying a payload of more than 3,000 lb., and is laying a dust swath more than double its 42-ft. wing span. According to its manufacturer, the plane uses a patented "Swathmaster" dispensing unit attached to the underside of the fuselage hopper to apply dry or liquid materials, seed or granular fertilizers without any changeover of applicating equipment. The craft, described as ruggedly constructed, is built to withstand action of corrosive chemicals, and can take off on short unpaved runways, it is claimed.

TABLE 2.—Regional Change in Consumption of Fertilizers in Year Ended June 30, 1958, from That in the Preceding Year

Region	Change from previous year in consumption as— Mixtures Tons	Materials* Tons	Total* Tons	Mixtures %	Materials* %	Total* %
New England	3,585	−552	3,033	1.0	−0.8	0.7
Middle Atlantic	−17,414	4,299	−13,115	−1.0	2.2	−.7
South Atlantic	−196,487	−56,811	−253,298	−4.1	−5.6	−4.4
East North Central	8,577	114,172	122,749	.3	9.2	2.7
West North Central	−17,374	148,280	130,906	−1.4	15.4	6.0
East South Central	−116,051	−132,547	−248,598	−6.1	−13.8	−8.7
West South Central	−1,047	22,111	21,064	−.2	3.2	1.6
Mountain	12,760	61,253	74,013	22.6	16.4	17.2
Pacific	27,480	73,841	101,321	7.9	5.3	5.8
Total	−295,971	234,046	−61,925	−2.0	3.4	−.3
Hawaii	−5,221	−66,675	−71,896	−8.0	−52.7	−37.5
Puerto Rico	−48,592	−7,320	−55,912	−21.1	−12.2	−19.3
United States	−349,784	160,051	−189,733	−2.4	2.3	−.9

*Excluding the quantity of secondary and trace nutrient materials.

TABLE 3—Fertilizers consumed as mixtures and as separate materials, year ended June 30, 1958, as compared with consumption of previous year, by State and region

State and region	Mixtures1/ July 1 - Dec. 31, 1957	Jan. 1 - June 30, 1958	Total	Materials2/ July 1 - Dec. 31, 1957	Jan. 1 - June 30, 1958	Total	Grand total	Comparison with total consumption in year ended June 30, 1957: Fertilizer3/	N, avail. P_2O_5 & K_2O
	Tons	Tons	Tons	Tons	Tons	Tons	Tons	Percent	Percent
Maine	11,497	159,377	170,874	4,258	3,736	7,994	178,868	104	107
New Hampshire	2,550	13,319	15,869	1,124	3,069	4,193	20,062	103	103
Vermont	5,026	35,166	40,192	12,776	4,581	17,357	57,549	104	103
Massachusetts	12,149	55,744	67,893	6,040	13,050	19,090	86,983	101	100
Rhode Island	2,144	13,065	15,209	630	1,469	2,099	17,308	102	102
Connecticut	7,727	49,114	56,841	4,227	15,879	20,106	76,947	91	96
New England	41,093	325,785	366,878	29,055	41,784	70,839	437,717	101	103
New York	120,979	430,694	551,673	27,854	56,071	83,925	635,598	110	110
New Jersey	39,288	153,349	192,637	6,979	15,961	22,940	215,577	80	82
Pennsylvania	174,512	401,807	576,319	24,093	41,907	66,000	642,319	101	102
Delaware	13,303	65,459	78,762	1,129	2,547	3,676	82,438	94	94
District of Columbia	1,128	1,879	3,007	492	502	994	4,001	155	170
Maryland	66,159	195,231	261,390	5,295	11,413	16,708	278,098	95	97
West Virginia	11,629	52,752	64,381	2,695	6,674	9,369	73,750	90	90
Middle Atlantic	426,998	1,301,171	1,728,169	68,537	135,075	203,612	1,931,781	99	100
Virginia	128,722	480,431	609,153	17,930	78,354	96,284	705,437	91	95
North Carolina	171,108	1,029,363	1,200,471	40,509	269,822	310,331	1,510,802	97	100
South Carolina	84,690	440,709	525,399	32,189	175,164	207,353	732,752	90	92
Georgia	192,037	792,594	984,631	52,111	221,559	273,670	1,258,301	97	100
Florida	513,858	782,407	1,296,265	61,414	103,556	164,970	1,461,235	99	102
South Atlantic	1,090,415	3,525,504	4,615,919	204,153	848,455	1,052,608	5,668,527	96	99
Ohio	262,952	686,660	949,612	27,931	75,059	102,990	1,052,602	102	102
Indiana	227,128	623,308	850,436	53,074	178,673	231,747	1,082,183	100	103
Illinois	144,813	409,998	554,811	431,319	467,648	898,967	1,453,778	106	110
Michigan	170,679	405,371	576,050	19,197	53,713	72,910	648,960	102	104
Wisconsin	46,663	348,322	394,985	12,638	32,849	45,487	440,472	103	106
East North Central	852,235	2,473,659	3,325,894	544,159	807,942	1,352,101	4,677,995	103	105
Minnesota	41,291	278,920	320,211	31,838	91,257	123,095	443,306	104	106
Iowa	46,323	293,274	339,597	57,337	145,158	202,495	542,092	117	118
Missouri	146,859	253,762	400,621	188,489	167,003	355,492	756,113	94	93
North Dakota	5,533	25,421	30,954	18,838	56,950	75,788	106,742	131	131
South Dakota	947	9,718	10,665	5,068	18,510	23,578	34,243	139	138
Nebraska	6,144	25,598	31,742	48,336	151,975	200,311	232,053	137	135
Kansas	40,833	28,122	68,955	75,147	53,445	128,592	197,547	93	95
West North Central	287,930	914,815	1,202,745	425,053	684,298	1,109,351	2,312,096	106	108
Kentucky	64,274	371,320	435,594	26,009	70,367	96,376	531,970	98	100
Tennessee	95,987	314,026	410,013	32,903	70,569	103,472	513,485	94	93
Alabama	130,317	562,132	692,449	62,409	192,328	254,737	947,186	91	94
Mississippi	18,011	239,473	257,484	150,597	224,133	374,730	632,214	85	84
East South Central	308,589	1,486,951	1,795,540	271,918	557,397	829,315	2,624,855	91	92
Arkansas	21,630	118,246	139,876	41,203	109,529	150,732	290,608	89	91
Louisiana	31,753	115,247	147,000	31,927	97,164	129,091	276,091	96	97
Oklahoma	24,856	33,370	58,226	26,893	21,809	48,702	106,928	99	100
Texas	83,829	202,496	286,325	130,853	250,614	381,467	667,792	112	115
West South Central	162,068	469,359	631,427	230,876	479,116	709,992	1,341,419	102	104
Montana	760	3,684	4,444	12,531	21,239	33,770	38,214	87	91
Idaho	1,291	6,910	8,201	19,804	80,028	99,832	108,033	134	133
Wyoming	192	1,178	1,370	1,344	10,160	11,504	12,874	123	119
Colorado	2,373	11,270	13,643	19,385	48,561	67,946	81,589	134	134
New Mexico	499	2,219	2,718	7,499	29,719	37,218	39,936	106	108
Arizona	9,333	23,233	32,566	63,958	112,412	176,370	208,936	112	120
Utah	950	3,374	4,324	5,034	30,351	35,385	39,709	123	129
Nevada	508	1,362	1,884	15,955	3,920	19,875	21,759	111	161
Mountain	15,920	53,230	69,150	145,510	336,390	481,900	551,050	117	120
Washington	8,405	36,720	45,125	72,690	129,924	202,614	247,739	142	140
Oregon	5,073	23,098	28,171	41,457	122,516	163,973	192,144	89	92
California	103,838	198,484	302,322	891,341	979,899	1,871,240	2,173,562	104	108
Pacific	117,316	258,302	375,618	1,005,488	1,232,339	2,237,827	2,613,445	106	111
Total	3,302,564	10,808,776	14,111,340	2,924,749	5,122,796	8,047,545	22,158,885	100	103
Hawaii	38,641	21,566	60,207	43,247	19,004	62,251	122,458	63	66
Puerto Rico	79,632	101,844	181,476	26,680	26,264	52,944	234,420	81	82
United States: 1957-58	3,420,837	10,932,186	14,353,023	2,994,676	5,168,064	8,162,740	22,515,763	99	102
1956-57	3,704,380	10,998,427	14,702,807	2,875,726	5,130,478	8,006,204	22,709,011	100	100
1955-56	3,545,913	11,229,740	14,775,653	2,508,638	4,909,679	7,418,317	22,193,970	98	95

1/ The classes of mixtures are listed in table 1 and the principal grades in tables and . 2/ The kinds of materials are listed in tables 1 and . Quantities include the primary nutrient (N, P_2O_5, K_2O) materials and the secondary and trace nutrient materials.
3/ Fertilizers which were guaranteed to contain one or more of the primary nutrients.

TABLE 4—Principal grades of mixtures consumed in U.S. Year ended June 30, 1958, compared with consumption of previous year

Grade	Consumption1/ 1957	1958	Proportion of total 1957	1958	Grade	Consumption1/ 1957	1958	Proportion of total 1957	1958
	Tons	Tons	Percent	Percent		Tons	Tons	Percent	Percent
0-9-27	13,848	12,853	0.10	0.09	6-8-8	278,438	239,274	1.94	1.69
0-10-20	77,023	76,963	.54	.54	6-8-12	16,979	14,516	.11	.11
0-10-30	47,908	51,339	.33	.37	6-9-12	24,767	21,908	.17	.15
0-12-12	13,573	11,431	.10	.08	6-10-4	89,016	76,780	.62	.55
0-12-36	10,546	13,557	.07	.09	6-12-6	34,330	35,630	.24	.25
0-14-14	162,169	186,776	1.12	1.33	6-12-12	371,569	389,039	2.57	2.76
0-15-30	20,002	24,228	.14	.17	6-18-6	14,414	25,361	.10	.18
0-20-20	304,514	285,711	2.12	2.02	6-24-12	105,127	144,589	.73	1.03
0-24-24	9,331	10,764	.06	.08	6-24-24	63,358	107,939	.44	.76
0-25-25	27,032	30,247	.19	.21	7-7-7	24,417	19,617	.17	.14
0-30-15	13,561	10,835	.09	.08	7-8-8	8,672	10,569	.06	.07
0-30-30	15,879	14,440	.11	.10	7-28-14	14,204	26,933	.10	.20
2-12-12	371,393	302,441	2.57	2.15	8-0-8	11,022	12,017	.08	.08
3-9-6	251,084	48,138	1.74	.34	8-0-24	17,869	20,463	.13	.15
3-9-9	528,959	500,107	3.67	3.54	8-4-8	41,763	53,300	.29	.37
3-9-12	26,998	28,229	.19	.20	8-4-12	6,990	13,314	.05	.10
3-9-18	61,932	63,982	.43	.45	8-8-4	15,536	11,706	.10	.08
3-9-27	75,262	67,528	.52	.48	8-8-8	221,474	205,192	1.54	1.46
3-12-6	108,552	89,117	.75	.63	8-12-12	59,701	68,877	.42	.48
3-12-12	908,575	708,604	6.31	5.03	8-16-16	166,068	191,186	1.16	1.36
3-18-9	36,428	29,246	.25	.20	8-24-0	10,220	21,890	.07	.15
3-18-18	0	14,551	0	.11	8-24-8	62,403	45,615	.43	.33
4-6-6	10,635	10,437	.07	.07	8-24-12	18,643	23,877	.13	.17
4-6-8	43,788	28,720	.31	.20	8-32-0	56,439	52,210	.39	.37
4-7-5	118,792	114,495	.82	.81	9-6-6	14,459	13,892	.10	.09
4-8-4	12,340	14,698	.09	.11	9-9-9	16,605	33,634	.12	.24
4-8-6	143,180	82,839	.99	.59	9-12-12	11,644	13,870	.08	.10
4-8-8	208,791	137,019	1.45	.97	10-0-10	21,182	17,547	.14	.12
4-8-10	87,176	84,934	.60	.60	10-6-4	59,507	78,079	.41	.56
4-8-12	74,057	113,281	.52	.80	10-10-5	26,279	23,061	.18	.16
4-9-3	52,208	49,950	.36	.36	10-10-10	689,131	701,970	4.79	4.98
4-10-6	105,956	86,319	.74	.61	10-20-0	53,834	47,466	.38	.33
4-10-7	362,433	306,541	2.52	2.17	10-20-5	5,451	11,912	.03	.09
4-10-10	17,075	21,440	.12	.15	10-20-10	140,494	165,234	.98	1.17
4-12-4	61,625	41,225	.43	.29	10-20-20	29,195	45,248	.20	.32
4-12-8	148,832	123,724	1.03	.88	12-0-10	16,846	16,385	.12	.11
4-12-12	949,433	1,021,630	6.59	7.24	12-0-12	7,711	11,219	.05	.08
4-16-8	22,371	26,168	.16	.19	12-6-6	13,164	23,024	.09	.17
4-16-16	527,812	469,477	3.66	3.32	12-12-12	611,110	690,322	4.24	4.89
5-6-8	10,264	12,472	.07	.09	12-24-12	29,958	31,864	.21	.22
5-7-5	22,311	19,751	.15	.14	13-13-13	44,801	47,658	.31	.34
5-10-5	604,630	535,745	4.19	3.80	14-0-14	54,770	53,046	.38	.37
5-10-10	1,407,706	1,479,466	9.78	10.48	14-14-14	45,114	43,390	.31	.31
5-10-15	150,218	206,112	1.04	1.46	15-0-15	9,756	11,492	.07	.08
5-10-30	4,109	10,080	.02	.07	15-5-5	2,186	12,786	.01	.09
5-20-10	73,446	85,592	.51	.60	15-10-10	4,953	12,089	.03	.09
5-20-20	787,324	818,501	5.46	5.81	15-15-0	19,351	20,709	.13	.14
6-4-6	20,022	17,982	.14	.12	15-15-15	27,695	29,953	.20	.22
6-4-8	59,255	54,872	.41	.39	16-8-8	6,287	10,983	.04	.07
6-6-6	95,018	92,844	.66	.66	16-48-0	15,342	19,571	.11	.14
6-6-8	37,781	37,136	.27	.26	17-7-0	21,061	14,541	.14	.11
6-6-12	12,033	21,233	.08	.15	20-0-20	9,729	10,275	.06	.07
6-6-18	9,832	13,443	.07	.10	20-20-0	7,003	12,264	.05	.09
6-8-6	130,846	115,721	.91	.82					
Grades of 10,000 tons or more						[2]13,306,316	[3]12,911,855	92.35	91.50
Grades of 5,000 to 9,999 tons						[4]356,835	[5]409,442	2.48	2.90
Grades of 2,500 to 4,999 tons						[5]207,242	[6]215,938	1.44	1.53
Grades under 2,500 tons						[7]218,949	[8]204,304	1.52	1.44
Not reported by grade						317,969	369,801	2.21	2.63
Total[9]						[10]14,407,311	[11]14,111,340	100.00	100.00

[1]Grades consumed in amounts of 10,000 tons or more in year ended June 30, 1958, and their consumption in year ended June 30, 1957. [2]104 grades. [3]108 grades. [4]49 grades. [5]56 grades. [6]62 grades. [7]1,301 grades. [8]1,817 grades. [9]Does not include the quantity of mixtures consumed in Alaska, Hawaii, or Puerto Rico. [10]1,510 grades. [11]2,043 grades.

Pacific regions, where they are principally used.

The total use of the 13-39 grade was 180 tons (0.4%) lower than in 1956-57; although there were increases in many areas, the decreased use in most of the West South Central states resulted in a slightly lower total use. The consumption of basic slag, which finds its greatest use in the South Atlantic and East South Central regions, was lower by 18,440 tons (11.3%).

The total consumption of potash materials in 1957-58 was lower than in 1956-57 by 12,361 tons (2.7%). This is the first time in many years that the total tonnage of these products has not shown an annual increase. The use of the 50-62% grades of potassium chloride, which comprised 81.3% of the total consumption of potash materials, decreased 11,379 tons (3.0%). The decreases were principally in the East South Central, West South Central, and South Atlantic regions and in Hawaii.

Consumption increased in four regions, and there was only a slight change elsewhere. The use of lime-potash mixtures and manure salts decreased while increases were shown for potassium-magnesium sulfate (28%), potassium-sodium nitrate (58%), and potassium sulfate (2%).

The quantities of most of the secondary and trace nutrient materials were lower in 1957-58 than in 1956-57. The use of gypsum (888,702 tons) comprising 95% of the total tonnage of such materials decreased only 0.3%.

The weighted average primary nutrient contents of the direct application materials used in each of the areas are shown in table 7. These averages are computed from the compositions and tonnages of the individual materials. In 1957-58, the national averages of materials containing only N, P_2O_5, or K_2O, were 34.43%, 17.95% (available P_2O_5), and 55.67% respectively, for multiple-nutrient materials the average was 25.48%, for all materials 30.11%. The corresponding averages in 1956-57 were 32.62%, 17.92%, 55.20%, 24.14%, and 28.81%. The higher national averages in 1957-58 reflect generally the greater use of the higher analysis products.

The increase in the nitrogen average was due principally to the larger tonnages of anhydrous ammonia and nitrogen solutions. The averages for materials containing only P_2O_5 or K_2O showed little change from those in 1956-57. The increase in the average for the multiple-nutrient materials was principally due to the increased use of ammoniated phosphates and activated sewage sludge, while the tonnages of the lower grade products (dried manures, etc.) did not change appreciably.

Primary Plant Nutrients

The fertilizers used in 1957-58 contained a total of 6,512,387 tons of N, available P_2O_5, and K_2O. The quantities of these nutrients consumed in each of the areas are shown in table 11, and the changes from the preceding year are given in table 12. The consumption of the nutrients was 135,185 tons (2.1%) more than that (6,377,202 tons, revised) in 1956-57. In 1957-58 the nutrients comprised 2,284,359 tons of N, 2,292,890 tons of available P_2O_5, and 1,935,138 tons of K_2O. Compared with the preceding year, nitrogen increased 149,072 tons (7.0%), but decreases occurred in available P_2O_5 (12,102 tons, 0.5%), and K_2O (1,785 tons, 0.1%). As shown in table 7, the national weighted average of primary nutrients in all fertilizers containing those nutrients was 30.18% in 1957-58 and 29.30% in the preceding year. Although the tonnage of fertilizers containing the nutrients in 1957-58 was 0.9% less than in 1956-57, the quantity of primary nutrients applied was 2.1% more.

Mixtures comprised 66.5% of the total tonnage of primary nutrient fertilizers and supplied 37.4% of the N, 78.4% of the available P_2O_5, and 87.0% of the K_2O. Compared with 1956-57, mixtures supplied 1.4% and 0.2% more N and K_2O and 1.0% less available P_2O_5. While the tonnage of mixtures decreased 2.4% in 1957-58, the total content of N, available P_2O_5, and K_2O was only 0.1% lower.

As shown in table 7, the national weighted average of primary nutrients in mixtures was 30.22% in 1957-58 and 29.53% (revised) in the preceding year.

Primary nutrient materials used for direct application comprised 33.5% of the total tonnage of fertilizers containing such nutrients; they accounted for 62.6% of the N, 21.6% of the available P_2O_5, and 13.0% of the K_2O. The quantities of N and available P_2O_5 supplied by direct application materials were, respectively, 10.6 and 1.4% higher, while that of K_2O was 1.8% lower, than in the preceding year.

Although the tonnage of materials containing these nutrients increased 2.3% in 1957-58, the total quantity of N, available P_2O_5, and K_2O supplied thereby, increased 6.9%. This is reflected in the national average of the total nutrient content of materials, shown in table 7, which was 30.11% in 1957-58 and 28.81% in the preceding year.

Although the national total of primary nutrients was higher in 1957-58 than in 1956-57, there were decreases in consumption of one or more of the nutrients, supplied by either mixtures or materials, in 46 of the 51 areas (table 12). In 12 areas, however, the increase in the quantity of a nutrient supplied by either a mixture or

TABLE 6. Ration of Primary Nutrients of Mixtures Consumed in Largest Tonnage in U.S., Year Ended June 30, 1958, Compared With Consumption of Previous Years*

Nutrient ratio†	Consumption 1957 Tons	Consumption 1958 Tons	all mixtures* Proportion of quantity of 1957 %	1958 %
1:2:2	2,185,187	2,245,038	15.2	15.9
1:4:4	2,287,069	2,104,639	15.8	14.9
1:1:1	1,783,217	1,868,314	12.4	13.2
1:3:3	1,490,491	1,535,657	10.3	10.9
1:2:1	836,800	800,611	5.8	5.7
0:1:1	542,682	546,498	3.8	3.9
1:4:2	326,880	381,942	2.3	2.7
1:2:3	233,578	331,163	1.6	2.4
1:6:6	371,395	316,992	2.6	2.3
4:10:7	362,853	306,711	2.5	2.2
Total	10,420,152	10,437,565	72.3	74.1

*Excluding Alaska, Hawaii and Puerto Rico.
†N:available P_2O_5:K_2O.

TABLE 5—Mixtures consumed in States and regions, by grade, year ended June 30, 1958

State	Consumption of 15 principal grades in indicated region Tons															Other grades No.1/	Other grades Tons2/	Total tons
New England																		
	8-12-12	10-10-10	5-10-10	8-16-16	6-9-12	0-20-20	0-15-30	8-9-10	5-8-7	6-3-6	7-7-7	5-10-5	8-12-16	6-10-4	11-12-14			
Maine	58,136	24,606	8,318	14,836	21,855	3,334	532	9,470	1,740	0	310	370	6,117	182	5,684	42	15,384	170,874
New Hampshire	1,059	3,006	2,290	5,378	0	206	1,338	0	630	0	535	211	0	249	0	22	967	15,869
Vermont	555	8,495	5,550	7,719	0	12,920	2,963	0	42	0	261	72	75	27	0	26	1,513	40,192
Massachusetts	1,329	12,647	15,174	5,993	15	394	1,501	0	3,543	1,093	3,140	2,515	0	3,186	0	29	17,363	67,893
Rhode Island	884	1,361	7,297	313	0	253	328	0	462	0	470	315	0	132	0	25	3,394	15,209
Connecticut	1,279	11,286	10,004	2,741	0	1,473	3,469	0	1,580	5,609	1,883	2,753	0	1,920	0	68	12,844	56,841
Total	63,242	61,401	48,633	36,980	21,870	18,580	10,131	9,470	7,997	6,702	6,599	6,236	6,192	5,696	5,684	101	51,465	366,878
Middle Atlantic																		
	5-10-10	5-10-5	10-10-10	8-16-16	3-12-6	0-20-20	6-12-12	6-12-6	10-6-4	3-12-12	2-12-12	4-8-12	10-20-20	5-10-15	4-12-12			
New York	143,726	109,569	72,751	63,979	1,569	17,313	15,334	26,091	16,215	2,385	2	1,557	7,737	9,327	186	92	63,932	551,673
New Jersey	99,781	21,961	8,435	1,845	629	2,395	4,104	1,640	4,112	1,032	130	401	5,528	861	53	67	39,730	192,637
Pennsylvania	267,205	20,009	60,173	35,957	41,845	34,685	10,097	1,128	3,613	11,913	6,050	7,111	6,411	1,899	13,476	111	54,747	576,319
Delaware	36,762	1,188	8,063	3,355	432	1,667	2,869	0	218	961	4,354	877	656	6,674	1,362	66	9,324	78,762
Dist. of Col.	76	1,428	12	0	1	1	0	0	641	2	4	6	0	0	0	25	836	3,007
Maryland	97,369	25,070	22,484	7,181	21,451	6,376	2,825	3	3,058	9,430	12,703	13,508	2,527	1,607	4,133	91	31,665	261,390
West Virginia	31,134	2,440	3,522	338	6,310	5,005	371	5	531	347	2,617	27	430	172	90	55	11,042	64,381
Total	676,053	181,665	175,440	112,655	72,237	67,442	35,600	28,867	28,388	26,070	25,860	23,487	23,289	20,540	19,300	196	211,276	1,728,169
South Atlantic																		
	4-12-12	5-10-10	3-9-9	2-12-12	4-8-8	4-7-5	5-10-5	8-8-8	6-6-6	6-8-6	4-8-12	4-10-6	4-8-10	4-8-6	10-10-10			
Virginia	12,838	157,838	45,350	126,659	0	0	62,298	6,692	0	12,191	0	0	7,148	0	40,722	28	137,417	609,153
North Carolina	23,666	387,273	271,323	129,778	0	0	312	33,397	0	49,660	54,010	255	56,120	0	14,906	18	179,771	1,200,471
South Carolina	95,026	27,857	129,099	0	64	0	33,946	6,669	0	3,933	33,816	85,917	0	0	1,529	29	107,543	525,399
Georgia	633,004	6,424	46,970	11,848	56,237	0	3,240	5,352	94	19,637	0	28	0	52,203	793	114	148,801	984,631
Florida	46,229	3,633	6,170	4,822	73,844	114,495	2,383	42,778	91,905	4,471	1,560	105	21,477	30,587	8,543	1,366	843,263	1,296,265
Total	810,763	583,025	498,912	273,107	130,145	114,495	102,179	94,888	91,999	89,892	89,386	86,305	84,745	82,790	66,493	1,387	1,416,795	4,615,919
East North Central																		
	5-20-20	3-12-12	4-16-16	12-12-12	10-10-10	0-20-20	5-10-10	6-24-12	6-24-24	3-9-27	0-10-30	10-6-4	5-20-10	6-12-12	3-18-9			
Ohio	100,740	287,905	53,393	99,674	64,478	28,857	116,345	28,557	4,765	810	1,033	14,557	4,739	14,030	15,976	107	113,753	949,612
Indiana	192,311	71,573	182,032	132,876	51,514	38,074	2,970	11,999	19,397	15,967	11,249	2,697	1,351	4,561	3,174	141	108,691	850,436
Illinois	58,693	46,544	81,306	57,793	80,188	20,565	478	5,072	17,550	18,372	3,359	2,966	4,423	2,878	362	143	154,262	554,811
Michigan	124,293	94,505	88,544	86,165	25,637	10,487	2,893	30,368	2,226	2,636	2,976	14,823	19,535	6,459	8,707	102	55,796	576,050
Wisconsin	112,023	36,338	37,633	8,203	34,419	30,300	145	1,364	26,191	16,824	30,328	761	572	1,687	1,015	81	57,182	394,985
Total	588,060	536,865	442,908	384,711	256,236	128,283	122,831	77,360	70,129	54,609	48,945	35,804	30,620	29,615	29,234	276	489,684	3,325,894
West North Central																		
	12-12-12	5-20-20	6-24-12	10-10-10	5-20-10	8-24-8	3-12-12	0-20-20	10-20-0	8-24-12	8-32-0	4-16-16	8-8-8	6-24-24	4-12-4			
Minnesota	7,844	85,691	59,323	10,099	5,535	0	752	13,275	2,411	21,947	3,894	10,080	70	6,479	2	112	92,809	320,211
Iowa	25,386	96,072	5,065	35,321	45,214	398	7,415	9,634	11,813	283	10,370	5,765	26	5,815	17	223	81,003	339,597
Missouri	184,840	13,030	64	12,892	564	25,154	25,724	10,370	257	0	91	3,965	17,272	4,792	14,544	64	87,062	400,621
North Dakota	737	617	1,641	52	0	0	40	32	153	1,387	484	83	0	114	0	58	25,614	30,954
South Dakota	117	18	347	150	2	11	0	8	1,807	58	2,607	0	0	0	0	48	5,540	10,665
Nebraska	859	415	126	77	1,627	457	0	377	3,698	0	3,849	0	4	88	13	104	20,152	31,742
Kansas	3,249	292	0	1,533	0	13,513	323	416	9,062	0	1,129	3	204	54	2,002	58	37,175	68,955
Total	223,032	196,135	66,566	60,124	52,942	39,533	34,254	34,112	29,201	23,675	22,424	19,896	17,576	17,342	16,578	302	349,355	1,202,745
	6-12-12	4-10-7	4-12-12	6-8-8	5-10-15	0-14-14	4-12-8	5-10-5	10-10-10	3-9-6	3-12-12	5-10-10	8-8-8	6-8-6	0-20-20			
Kentucky	28,414	0	745	0	103,276	497	85,286	2,346	36,758	10,373	32,176	14,995	413	21,910	8,162	113	90,243	435,594
Tennessee	255,806	313	1,058	1,607	20,970	281	5,982	3,643	4,204	35,720	6,278	10,147	1,567	439	4,345	99	57,653	410,013
Alabama	37	266,010	185,891	61,569	0	116,029	0	616	5,495	0	0	259	17,012	179	5,832	55	33,520	692,449
Mississippi	3,204	6,546	1,850	115,051	0	2,790	0	71,048	24	0	432	9,355	6,704	0	4,166	44	36,314	257,484
Total	287,461	272,869	189,544	178,227	124,246	119,597	91,268	77,653	46,481	46,093	38,886	34,756	25,696	22,528	22,505	175	217,790	1,795,540
West South Central																		
	5-10-5	10-20-10	12-12-12	8-8-8	12-24-12	6-24-24	13-13-13	3-12-12	5-20-20	6-8-12	10-20-0	6-8-8	0-20-20	5-10-10	4-12-4			
Arkansas	30,375	22,976	12,982	1,567	446	2,490	4,766	611	1,630	13,287	52	42	7,257	2,328	123	55	38,944	139,876
Louisiana	19,836	4,892	22,722	26,888	1,576	10,171	4,778	13,176	8,525	36	0	11,210	2,248	2,706	6,296	53	11,940	147,000
Oklahoma	16,144	18,580	644	198	1,790	763	253	202	510	0	5,439	0	89	765	649	60	12,200	58,226
Texas	81,668	88,951	6,361	11,592	18,968	1,800	4,930	552	2,973	1	6,903	118	74	3,114	954	125	57,366	286,325
Total	148,023	135,399	42,709	40,245	22,780	15,224	14,727	14,541	13,638	13,324	12,394	11,370	9,668	8,913	8,022	180	120,450	631,427
Mountain																		
	20-20-0	10-20-5	10-20-0	6-10-4	24-20-0	20-10-0	10-20-10	10-18-5	10-10-10	16-16-8	10-10-0	10-16-8	15-20-0	8-24-0	20-20-10			
Montana	1,068	0	1,321	166	259	298	13	281	0	136	0	0	0	67	0	17	835	4,444
Idaho	1,497	1	242	201	3,260	205	0	356	0	147	25	264	0	405	0	42	1,598	8,201
Wyoming	63	0	199	29	0	47	26	30	0	48	0	0	0	6	0	21	922	1,370
Colorado	420	0	392	986	0	184	163	1,160	309	471	0	1,107	0	0	1,040	65	7,411	13,643
New Mexico	574	93	137	5	0	0	106	0	40	108	79	0	0	344	0	37	1,232	2,718
Arizona	4,873	6,371	2,711	238	61	2,148	1,768	0	1,236	322	1,394	0	1,234	327	0	63	9,883	32,566
Utah	91	0	106	2,469	41	42	0	87	0	269	0	0	0	0	0	36	1,219	4,324
Nevada	195	0	203	395	0	156	0	0	94	79	0	0	0	0	0	25	762	1,884
Total	8,781	6,465	5,311	4,489	3,621	3,080	2,076	1,914	1,679	1,580	1,498	1,371	1,234	1,149	1,040	166	23,862	69,150
Pacific																		
	10-10-10	10-10-5	17-7-0	6-10-4	8-8-4	15-8-4	4-4-2	8-24-0	10-20-20	14-14-7	8-10-12	6-20-20	5-3-2	4-10-10	5-10-10			
Washington	750	119	0	2,687	0	0	0	4,618	3,638	0	0	2,297	2,268	0	3,136	125	25,612	45,125
Oregon	481	0	0	2,401	0	0	0	1,214	1,595	0	0	2,260	1,664	0	683	74	17,873	28,171
California	28,379	18,823	14,384	5,526	9,774	8,389	6,262	129	10	5,034	5,001	90	0	3,854	0	3/ 47	196,667	302,322
Total	29,610	18,942	14,384	10,614	9,774	8,389	6,262	5,961	5,243	5,034	5,001	4,647	3,932	3,854	3,819	140	240,152	375,618
Other4/																		
	14-4-10	15-4-7	14-2-8	10-10-8	8-6-10	6-8-10	10-6-20	13-3-12	12-3-16	12-4-10	12-6-10	12-10-5	9-10-5	12-6-8	16-4-5			
Puerto Rico	46,937	17,212	15,134	12,432	11,277	9,973	8,812	6,296	6,151	5,596	5,577	4,715	4,417	3,388	3,226	27	20,333	181,476
United States5/																		
	5-10-10	4-12-12	5-20-20	3-12-12	10-10-10	12-12-12	5-10-5	3-9-9	4-16-16	6-12-12	4-10-7	2-12-12	0-20-20	6-8-8	5-10-15			
New England	48,633	0	0	67	61,401	5,383	6,236	0	0	2,001	0	0	18,580	4,298	6	107	220,273	366,878
Mid. Atlantic	676,053	19,300	652	26,070	175,440	17,254	181,665	310	574	35,600	0	25,860	67,442	84	20,540	197	481,325	1,728,169
So. Atlantic	583,025	810,763	518	57,914	66,493	3,167	102,179	498,912	887	19,639	33,672	273,107	4,271	45,168	50,776	1,387	2,065,428	4,615,919
E. No. Cent.	122,831	1,815	588,060	536,865	256,236	384,711	12,470	571	442,908	29,615	0	0	128,283	127	10,368	278	811,034	3,325,894
W. No. Cent.	1,435	70	196,135	34,254	60,124	223,032	6,600	0	19,896	10,685	0	0	34,112	0	3	306	616,399	1,202,745
E. So. Cent.	34,756	189,544	19,475	38,886	46,481	12,437	77,653	299	5,206	287,461	272,869	3,474	22,505	178,227	124,246	175	482,021	1,795,540
W. So. Cent.	8,913	112	13,638	14,541	4,506	42,709	148,023	10	6	3,918	0	0	9,668	11,370	105	182	373,908	631,427
Mountain	1	26	23	7	1,679	560	651	5	0	78	0	0	129	0	0	171	65,991	69,150
Pacific	3,819	0	0	0	29,610	1,069	268	0	0	42	0	0	721	0	68	148	340,021	375,618
Total	1,479,466	1,021,630	818,501	708,604	701,970	590,322	535,745	500,107	469,477	389,039	306,541	302,441	285,711	239,274	206,112	2,088	5,456,400	14,111,340

1/ Exclusive of mixtures not reported by grade. 2/ Including the tonnage of mixtures not reported by grade. 3/ Total number of mixtures exceeds 900 of which only 60 were reported by grade. 4/ Total consumption in Hawaii was 60,207 tons of mixtures, comprising 104 grades, most of which were manufactured to consumers specifications. Total consumption in Alaska was estimated to be less than 200 tons of mixtures. 5/ Exclusive of Alaska, Hawaii, and Puerto Rico.

a material was sufficiently high to offset the decrease in that nutrient in the other category.

In the other 34 areas the decrease in the nutrient in one category was not offset by an increase in the other category. Nitrogen decreased in 15 such areas, available P_2O_5 in 26, and K_2O in 23. Most were in the southeastern part of the country.

The national use of nitrogen increased 149,072 tons, of which 11,578 tons (7.8%) were supplied by mixtures and 137,494 tons (92.2%) by materials. The increase in nitrogen was largest in the West North Central region, followed by the East North Central and Pacific regions, while the largest decrease was in the East South Central region.

The national use of available P_2O_5 decreased 12,102 tons. The quantity in mixtures decreased 19,036 tons, while that in materials increased 6,934 tons. The decreased use in mixtures was largely in the South Atlantic and East South Central regions. While there were variations in the changes in the other areas, the principal increases for mixtures were in the East North Central and Pacific regions and for materials in the East and West North Central and the Mountain regions.

The national use of K_2O decreased 1,785 tons. The use in mixtures increased 2,789 tons while that in materials decreased 4,574 tons. The higher consumption of K_2O in mixtures chiefly in the South Atlantic, East North Central, and Pacific regions more than offset its lower use in other areas, notably the West North Central and East South Central regions and Puerto Rico. Its use in direct application materials was generally lower in the southeastern part of the country while only in the East North Central region were increases shown in all of the states.

The quantities of primary nutrients in the principal kinds of fertilizers used in 1957-58 are shown by regions in table 13. Seventy-seven percent of the national consumption of nitrogen was in four commodities—N-P-K mixtures, anhydrous ammonia, ammonium nitrate, and ammonium sulfate—which supplied, respectively: 34.2%, 21.0%, 16.5%, and 5.3%. These four commodities accounted for 61% (Pacific) to 92% (Middle Atlantic) of the regional consumptions.

In the Pacific region, aqua ammonia supplied a large part of the nitrogen, while in the Middle Atlantic region 80% of the nitrogen was in N-P-K mixtures.

More than 76% of the national consumption of available P_2O_5 was in two commodities—N-P-K mixtures and superphosphate grades over 22% P_2O_5—which supplied, respectively, 68.8% and 7.4%. They supplied 39% (Pacific) to 91% (South Atlantic) of the regional consumptions. Ammoniated phosphate supplied an important part of the P_2O_5 in the western part of the country.

N-P-K mixtures supplied more than 76% of the national consumption of K_2O. The regional proportions ranged from 61% to 86%. Its use as potassium chloride or as N-K mixtures was important in some areas.

TABLE 9. Consumption of Classes of Materials in U.S., Years Ended June 30, 1957, and 1958, With Comparisons

Class	Consumption 1957 Tons	Consumption 1958 Tons	Change in consumption Tons	Change in consumption %
Chemical nitrogen materials	3,706,428	3,877,377	170,949	4.6
Natural organic materials	479,671	493,252	13,581	2.8
Phosphate materials	2,415,963	2,403,845	—12,118	—.5
Potash materials	460,899	448,538	—12,361	—2.7
Secondary and trace nutrient materials	943,243	939,728	—3,515	—.4
Total	8,006,204	8,162,740	156,536	2.0

TABLE 8—Materials for direct application consumed in States and regions, by class and by product, year ended June 30, 1958

Tons

State and region	Chemical nitrogen materials: Ammonia (anhydrous)	Ammonium nitrate	Ammonium nitrate-limestone mixtures	Ammonium sulfate	Calcium cyanamide	Nitrogen solutions and aqua ammonia 2/	Sodium nitrate	Urea	Other 2/	Natural organics 2/	Phosphate materials 2/: Phosphate rock 3/	Superphosphates: Grades 22 percent and under	Superphosphates: Grades over 22 percent	Other	Potash materials: Chlorides 50-62 percent grades	Other 2/	Total: Primary nutrient materials	Secondary and trace nutrient materials 2/
Maine	0	1,030	1	80	848	204	144	117	29	875	3	4,938	1	88	146	45	7,969	25
New Hampshire	0	538	13	1	136	222	71	49	11	858	10	2,022	10	61	141	42	4,185	8
Vermont	0	1,080	29	4	3	142	22	159	8	199	43	15,367	0	35	311	2	17,344	13
Massachusetts	0	1,290	103	383	292	10	769	138	71	11,495	158	3,036	10	748	537	6	19,006	84
Rhode Island	0	102	5	1	144	0	63	73	36	1,343	12	185	0	67	38	1	2,020	29
Connecticut	0	640	11	62	556	306	513	540	81	10,325	48	4,739	90	726	657	582	20,076	30
New England	0	4,780	162	531	1,979	904	1,582	1,076	236	25,095	274	30,287	111	1,725	1,830	678	70,650	189
New York	848	13,215	761	272	4,105	1,177	3,643	1,301	825	17,009	757	32,784	544	888	1,758	1,296	83,183	742
New Jersey	362	2,438	265	387	1,621	253	2,201	601	775	7,462	227	3,309	25	1,840	661	432	22,859	81
Pennsylvania	686	10,376	129	3,491	1,287	578	1,493	799	501	9,676	4,786	23,904	1,941	1,735	1,495	839	63,646	2,354
Delaware	50	709	292	1	527	652	154	106	2	254	200	296	0	87	158	18	3,906	170
District of Columbia	0	11	0	2	0	0	14	15	14	878	0	10	0	49	1	0	994	0
Maryland	529	2,061	713	39	1,482	1,032	1,596	800	85	1,615	1,591	3,175	8	613	989	190	16,118	590
West Virginia	0	1,006	35	307	11	0	1,206	39	14	510	91	5,490	407	60	182	9	9,367	2
Middle Atlantic	2,485	31,816	2,195	4,499	9,033	3,692	10,307	3,661	2,216	37,404	7,572	68,968	2,925	5,272	4,844	2,784	199,673	3,939
Virginia	737	7,608	18,289	1,358	978	8,598	14,618	221	280	918	1,513	6,443	304	3,025	3,118	13,479	81,497	14,787
North Carolina	7,895	15,712	100,453	204	4,035	33,845	65,584	475	1	2,923	525	12,776	36	4,577	9,671	10,938	269,650	40,681
South Carolina	1,699	19,803	61,303	323	1,206	21,469	63,209	87	809	1,263	380	10,642	89	5,984	14,614	1,507	203,927	3,426
Georgia	11,650	73,915	37,923	3,746	817	13,908	56,970	185	183	2,004	4,417	13,392	86	9,306	6,008	1,399	235,909	37,761
Florida	3,194	19,331	5,976	6,032	1,822	6,774	41,433	2,846	9,717	14,771	11,746	7,176	5,190	4,614	2,195	17,134	159,951	5,019
South Atlantic	25,175	136,369	223,944	11,673	8,858	84,594	241,814	3,814	10,990	21,879	18,521	50,429	5,705	27,106	35,606	44,457	950,934	101,674
Ohio	3,983	21,508	2	15,544	496	5,295	645	1,942	1,054	8,460	7,911	15,777	5,939	4,410	8,789	943	102,658	332
Indiana	18,555	44,497	1,403	14,158	365	25,377	121	6,010	375	2,262	20,596	4,900	16,042	4,979	60,540	3,439	231,619	128
Illinois	25,386	51,412	386	63,914	81	20,422	79	1,360	374	12,599	530,886	27,800	51,694	14,080	97,413	101	897,967	1,000
Michigan	4,104	14,974	294	2,686	119	5,846	537	2,484	808	14,513	3,851	8,745	1,674	2,360	6,416	2,632	71,983	927
Wisconsin	5,123	5,707	0	806	7	4,694	0	154	309	8,810	3,122	1,844	1,332	2,305	10,219	889	45,341	146
East North Central	57,151	138,098	2,025	97,108	1,028	61,634	1,382	11,950	2,920	46,644	566,366	59,066	76,681	28,134	191,377	8,004	1,349,568	2,533
Minnesota	19,573	15,433	105	387	0	14,551	0	444	121	4,150	1,322	4,950	25,691	24,249	12,044	3	123,031	64
Iowa	18,116	49,526	21	3,900	0	19,108	0	591	176	5,359	6,989	32,182	31,738	20,773	13,865	75	202,417	78
Missouri	21,508	65,096	0	4,425	188	12,996	286	224	96	4,982	209,047	1,793	8,963	7,506	18,195	80	355,345	347
North Dakota	555	2,071	0	32	0	43	0	40	10	68	0	13	17,758	55,196	2	0	75,788	0
South Dakota	1,374	5,941	0	80	0	1,002	0	105	79	340	40	195	5,259	9,140	22	0	23,577	1
Nebraska	60,517	52,492	0	1,877	0	43,262	0	1,668	83	1,026	754	1,634	17,948	10,554	271	199	200,235	76
Kansas	9,441	52,581	47	1,120	1	1,112	0	724	35	753	176	782	25,449	35,310	995	0	128,466	126
West North Central	139,082	243,040	173	11,771	189	92,074	286	3,796	600	16,686	218,328	41,549	132,806	162,728	45,394	357	1,108,859	492
Kentucky	3,137	32,838	498	1,003	1,356	1,631	1,657	169	25	522	11,371	19,745	1,284	6,927	7,973	6,169	96,245	131
Tennessee	5,440	33,839	1,040	452	1,771	120	19,057	22	7	1,013	1,192	7,055	3,185	9,450	10,476	8,122	103,041	431
Alabama	4,222	73,331	24,536	10,013	217	742	67,994	12	12	670	1,496	23,238	389	37,110	8,551	196	252,709	2,028
Mississippi	39,033	144,069	4,723	454	6,298	6,973	41,260	1,009	139	35	2,558	24,729	1,433	87,083	14,282	597	374,675	55
East South Central	51,832	284,077	30,797	11,922	9,642	9,466	129,968	1,212	183	2,240	16,617	75,567	6,211	140,570	41,282	15,084	826,670	2,645
Arkansas	21,373	41,737	3	4,004	4,692	7,634	25,406	7,322	2	65	807	4,439	8,717	1,633	23,407	91	150,730	2
Louisiana	27,132	33,130	321	11,946	1,180	9,220	21,585	1,426	475	448	4,533	6,080	2,266	6,569	2,851	466	129,028	63
Oklahoma	1,464	6,007	20	1,518	0	298	572	295	7	1,413	2,967	17,161	7,868	8,645	458	49	48,702	0
Texas	89,958	25,268	190	80,910	595	13,418	1,594	9,657	120	6,431	11,622	31,028	24,079	78,146	2,193	1,246	376,457	5,010
West South Central	139,927	106,142	534	97,778	6,467	30,570	49,157	18,700	604	8,357	19,329	58,708	42,930	94,993	28,909	1,852	704,917	5,075
Montana	1,576	4,127	1	483	0	666	0	109	21	240	0	0	18,746	7,305	41	14	33,327	443
Idaho	6,742	17,912	1	17,371	238	14,593	30	401	171	534	180	661	19,977	14,110	992	40	93,253	6,579
Wyoming	1,003	3,350	0	632	0	4	0	525	10	18	0	50	4,047	1,859	6	0	11,504	0
Colorado	5,896	23,583	341	4,062	75	1,747	0	2,099	357	1,485	40	167	14,122	10,549	388	126	65,037	2,909
New Mexico	4,608	2,608	49	3,801	0	1,555	0	2,761	6	1,285	0	5,726	8,589	6,001	77	72	37,176	42
Arizona	21,201	8,295	3,287	30,168	859	13,343	422	12,691	11,900	3,352	40	6,648	3,063	39,670	100	907	155,886	20,484
Utah	2,088	10,090	2	6,108	1	246	0	388	459	476	0	2,395	8,397	4,389	54	0	35,093	292
Nevada	162	307	1	545	0	451	41	60	12	252	0	0	838	1,224	14	7	3,914	15,961
Mountain	42,734	70,272	1,682	63,170	1,173	32,605	493	19,034	12,936	7,642	200	15,645	77,739	85,107	1,632	1,166	435,190	46,710
Washington	36,926	30,475	10	13,243	230	60,866	120	975	2,628	4,527	980	5,772	7,221	26,614	2,929	1,124	194,580	8,034
Oregon	7,901	25,923	7	37,226	913	35,246	5	3,701	2,423	814	331	7,615	1,490	25,236	1,689	154	150,634	13,339
California	79,429	45,916	43	175,535	7,436	249,910	261	22,368	30,717	4/ 321,854	283	58,537	18,857	100,104	1,411	5,977	1,118,638	752,602
Pacific	124,256	102,314	60	226,004	8,579	346,022	386	27,044	35,768	327,195	1,534	71,924	27,528	151,954	6,029	7,255	1,463,852	773,975
Total	582,662	1,116,908	263,512	524,456	46,948	661,521	435,375	90,287	66,453	493,142	848,741	472,143	372,636	697,589	356,903	81,637	7,110,313	937,232
Hawaii	0	0	0	6,522	0	24,372	133	7,791	111	110	2,804	4,192	1,610	2,447	7,798	1,865	59,755	2,496
Puerto Rico	772	0	0	46,133	0	3,715	1	305	0	0	0	1,555	117	11	89	246	52,944	0
United States: 1957-58	583,434	1,116,908	263,512	577,111	46,948	689,608	435,509	98,383	66,564	493,252	851,545	477,890	374,363	700,047	364,790	83,748	7,223,012	939,728
1956-57	452,702	1,105,196	300,586	516,183	46,978	627,310	493,159	108,916	55,398	479,671	836,183	559,998	373,969	645,813	376,169	84,730	7,062,961	943,243
1955-56	419,354	940,666	313,920	414,398	65,818	418,843	542,804	92,373	64,668	472,706	930,914	607,026	325,723	614,652	322,411	82,428	6,628,712	789,605

1/ Excluding lime and the quantities used for manufacture of commercial mixtures. 2/ The principal kinds are shown separately in table 1, by regions. 3/ Including colloidal phosphate, the quantity of which is shown separately in table 1, by regions. 4/ Including an estimated 260,000 tons of dried manures.

TABLE 10—Ammoniated phosphates consumed in States and regions as direct-application materials, by grades, year ended June 30, 1958

Tons

State and region	Grade 2/ 11-48	13-39	16-20	27-14	21-53
New York	78	0	0	0	0
New Jersey	22	0	0	0	0
Pennsylvania	343	0	0	0	109
Maryland	11	0	0	0	4
Middle Atlantic	454	0	0	0	113
Virginia	40	0	0	0	999
North Carolina	0	0	0	0	181
South Carolina	0	0	0	0	75
Georgia	0	0	0	0	285
Florida 3/	5	0	0	0	1
South Atlantic	45	0	0	0	1,541
Ohio	2,031	0	194	0	638
Indiana	3,823	65	62	0	764
Illinois	2,388	134	680	0	1,777
Michigan	1,239	4	0	0	422
Wisconsin	147	17	12	0	195
East North Central	9,628	220	948	0	3,796
Minnesota	10,733	2,338	4,757	464	937
Iowa	1,918	2,708	9,257	831	602
Missouri	1,369	216	1,057	0	12
North Dakota	26,303	3,722	23,648	1,276	191
South Dakota	2,265	223	5,573	626	307
Nebraska	1,619	1,325	5,027	15	2,309
Kansas	818	7,840	25,316	0	1,144
West North Central	45,025	18,372	74,635	3,212	5,502
Kentucky	2	18	0	0	446
Tennessee	0	0	0	0	1,495
Alabama	0	0	0	0	1,263
Mississippi	9	6	73	0	252
East South Central	11	24	73	0	3,456
Arkansas	69	113	747	0	2
Louisiana	35	12	3,082	0	0
Oklahoma	517	3,206	4,753	0	116
Texas	2,918	11,604	58,735	0	2,909
West South Central	3,539	14,935	67,317	0	3,027
Montana	2,700	81	2,494	401	0
Idaho	785	375	9,693	2,750	40
Wyoming	93	38	145	16	1,173
Colorado	154	986	1,071	0	4,035
New Mexico	675	1,058	3,941	0	327
Arizona	3,133	3,074	27,127	645	2,199
Utah	1,575	23	1,660	414	24
Nevada	43	124	865	110	5
Mountain	9,158	5,759	46,996	4,336	7,803
Washington	1,894	653	14,486	7,616	259
Oregon	1,710	662	22,031	229	130
California 4/	10,507	4,851	68,268	2,290	684
Pacific	14,111	6,166	104,785	10,135	1,073
Hawaii	1,095	0	261	0	1,091
Puerto Rico	0	0	0	0	11
United States	83,066	45,476	295,015	17,683	27,413

1/ There was no consumption in States not listed. 2/ Including the quantity of these grades reported as mixtures. 3/ In addition, 37 tons of 4-16-0 grade ammoniated superphosphate was consumed. 4/ In addition, 3,012 tons of 4-16-0 grade ammoniated superphosphate was consumed.

NITROGEN

(Continued from page 17)

lation should be 16,000 an acre on heavy soil, 12,000 on lighter land.

2. Nitrogen fertilizer won't do very much good on water-logged land. It must be at least moderately well drained.

3. Nitrogen doesn't leach out of heavy soils as fast as some people think. In recent experiments in Sibley County, corn yielded 18 bushels more to the acre where 60 lb. nitrogen had been sidedressed the year before. In other words, nitrogen added in fertilizer does carry over from one year to the next on heavy soils.

4. Adding nitrogen fertilizer does not cause corn plants to produce more suckers—at least at rates up to 300 lb. nitrogen an acre. In fact, there is some evidence that nitrogen reduces suckering.

5. If applied properly, losses from gaseous forms of nitrogen fertilizer are not as great as sometimes suspected.

Important as nitrogen is, other plant food nutrients must not be overlooked in a good fertility campaign, Prof. A. C. Caldwell, University of Minnesota soils department, said at the meeting. Nitrogen pays off best when phosphate and potash are also added, he declared.

Mr. Caldwell told of experiments conducted in various parts of the state to prove his point. At the West Central Experiment Station, Morris, Minn., 60 lb. nitrogen applied alone last summer increased corn yields by only 2.8 bu. an acre.

Where the corn got 40 lb. each of phosphate and potash—in addition to the nitrogen—yields climbed by nearly 12 bu. an acre. This was on fields that raised alfalfa the year before, he explained.

At Crookston, Mr. Caldwell said a "complete" fertilizer increased beet yields by 2.2 tons an acre, while using nitrogen alone brought only a half-ton boost. Similar results occurred with oats at the Waseca station.

One of the most striking effects from "complete" fertilizer was in potato trials in the Red River Valley, he said. A dose of 50 lb. nitrogen, 240 lb. phosphate and 60 lb. potash increased yields by 106 bu. an acre. Where the potatoes got the nitrogen and potash, but no phosphate, the yield actually went down by 8 bu.

In wheat trials at Crookston, adding 40 lb. each of nitrogen and phosphate—and no potash—increased yields by nearly 15 bu. an acre. But to show how important the nitrogen was, Mr. Caldwell added that phosphate alone made only a 3.3-bu. increase. And nitrogen alone raised yields by 7.6 bu.

He concluded that the only way a farmer can be sure of just which nutrients his fields need is to have the soil tested first.

NURSERY INCORPORATED

AURORA, COLO.—Great Western Nurseries, Inc., 533 Fulton St., has been incorporated to purchase, hold and deal in plants, trees, shrubs, fertilizers, seeds and other nursery products. Incorporators and directors include Lewis E. Eagen, Kenneth E. Barrett and Duane A. Schroder.

TABLE 7—Primary plant nutrient content of mixtures and of materials, as a weighted average, by States and regions, year ended June 30, 1958

Percent

State and region	Mixtures 2/ N	Mixtures 2/ Available P_2O_5	Mixtures 2/ K_2O	Mixtures 2/ Total	Materials: Single nutrient 3/ N	Materials: Single nutrient 3/ Available P_2O_5 4/	Materials: Single nutrient 3/ K_2O	Materials: Multiple nutrient 2/	Materials: Total nutrients	Total in mixtures and materials
Maine	8.16	11.98	12.88	33.02	29.76	20.60	51.31	9.55	22.26	32.54
New Hampshire	6.88	12.90	13.92	33.70	28.50	20.37	55.19	10.87	22.17	31.89
Vermont	4.80	15.32	16.44	36.56	33.64	19.93	56.55	11.16	21.59	32.05
Massachusetts	7.26	10.65	9.89	27.80	17.30	19.35	59.55	11.05	15.68	25.14
Rhode Island	6.29	10.45	10.39	27.13	20.17	18.78	58.98	9.43	14.83	25.65
Connecticut	6.74	10.32	10.72	27.78	27.22	21.94	59.44	12.72	19.16	25.53
New England	7.27	11.82	12.32	31.41	23.97	20.33	57.85	11.69	19.22	29.44
New York	6.60	12.04	10.36	29.00	27.90	20.37	52.10	10.16	22.85	28.19
New Jersey	5.71	10.92	10.61	27.24	24.75	19.07	43.18	13.06	21.00	26.59
Pennsylvania	5.33	12.43	11.68	29.44	29.97	20.08	52.49	13.15	23.29	28.83
Delaware	5.25	11.55	12.32	29.12	30.75	18.10	56.82	10.78	28.55	29.09
District of Columbia	7.42	9.44	5.35	22.21	18.33	20.60	60.75	9.62	10.87	19.39
Maryland	4.85	11.26	10.45	26.56	30.51	17.63	51.86	11.93	25.55	26.90
West Virginia	4.59	12.24	10.63	27.46	23.72	22.28	59.16	9.13	22.72	26.86
Middle Atlantic	5.68	11.91	10.93	28.52	28.22	20.15	51.21	11.74	23.03	27.95
Virginia	4.33	11.24	11.37	26.94	23.79	24.11	17.30	40.71	23.05	26.47
North Carolina	4.51	9.47	10.58	24.56	24.65	18.87	36.38	15.66	25.05	24.65
South Carolina	4.13	10.07	10.20	24.40	21.03	15.23	59.18	14.92	23.55	24.17
Georgia	4.43	10.76	11.46	26.65	28.24	14.45	57.45	20.15	27.45	26.81
Florida	6.00	6.75	9.01	21.76	23.43	15.77	50.86	18.77	22.03	21.80
South Atlantic	4.84	9.29	10.39	24.52	24.56	16.69	40.51	20.00	24.64	24.54
Ohio	5.65	14.45	13.28	33.38	33.11	21.80	57.45	22.73	30.86	33.13
Indiana	6.11	16.90	15.88	38.89	39.65	21.91	59.64	44.86	42.82	39.74
Illinois	6.78	15.20	14.36	36.34	35.33	8.18	61.77	24.22	19.26	25.78
Michigan	5.98	16.08	15.06	37.12	37.87	18.87	53.09	14.82	30.66	36.41
Wisconsin	4.43	16.32	20.28	41.03	49.01	27.70	57.53	12.01	39.73	40.90
East North Central	5.87	15.71	15.26	36.84	37.14	10.00	60.16	21.97	25.48	33.56
Minnesota	6.01	21.64	14.88	42.53	54.15	43.18	60.90	46.03	49.93	44.59
Iowa	6.88	18.71	12.84	38.43	43.19	32.30	59.88	34.86	39.38	38.79
Missouri	9.57	14.18	12.36	36.11	43.00	6.13	60.80	22.95	20.18	28.63
North Dakota	13.06	28.45	5.40	46.91	43.26	45.28	60.51	49.44	48.24	47.85
South Dakota	13.28	22.91	1.35	37.54	41.14	45.43	59.09	43.08	42.95	41.26
Nebraska	10.77	22.96	4.09	37.82	53.07	42.94	44.26	47.19	51.67	49.78
Kansas	11.32	24.01	5.00	40.33	40.42	43.92	60.40	41.02	41.47	41.07
West North Central	8.12	18.69	12.25	39.06	47.26	20.94	60.26	43.48	37.54	38.33
Kentucky	5.22	11.94	12.23	29.39	35.63	22.46	53.83	38.91	33.03	30.05
Tennessee	5.56	11.88	11.35	28.79	31.85	30.03	40.56	43.29	33.37	29.70
Alabama	3.62	11.21	10.37	25.20	25.80	13.46	59.47	48.70	24.18	24.92
Mississippi	6.08	9.89	8.20	24.17	37.92	12.30	59.87	43.44	30.89	28.15
East South Central	4.80	11.35	10.73	26.88	32.88	15.79	51.97	44.28	29.40	27.68
Arkansas	6.59	14.84	13.61	35.04	38.57	37.65	60.18	38.10	41.85	38.57
Louisiana	7.03	13.63	11.55	32.21	40.60	16.38	54.80	33.69	37.73	34.79
Oklahoma	8.15	18.20	7.37	33.72	37.83	26.23	55.82	39.23	31.62	32.76
Texas	8.53	16.19	8.01	32.73	48.75	27.13	46.93	38.51	42.55	38.31
West South Central	7.72	15.48	10.01	33.21	44.05	26.72	58.05	38.39	40.76	37.19
Montana	13.95	20.97	1.35	36.27	42.94	44.56	58.18	47.21	44.72	43.72
Idaho	18.10	19.70	2.41	40.21	31.78	43.73	61.79	39.02	35.92	36.26
Wyoming	13.65	20.95	2.04	36.64	42.16	44.47	60.50	69.49	46.60	45.54
Colorado	12.76	19.28	8.07	40.11	39.99	47.29	57.78	53.80	43.86	43.21
New Mexico	12.25	20.75	4.38	37.38	46.66	36.38	48.99	38.62	41.14	40.89
Arizona	13.46	18.22	3.89	35.57	37.30	34.59	54.02	39.55	37.75	37.37
Utah	8.60	14.52	4.72	27.84	34.04	40.86	60.67	44.59	37.54	36.47
Nevada	12.37	12.74	3.18	28.29	31.41	45.02	57.76	33.67	35.54	33.18
Mountain	13.53	18.56	4.39	36.48	37.00	42.10	57.43	41.98	39.29	38.90
Washington	9.46	14.75	8.94	33.15	39.27	33.97	55.74	35.23	38.58	37.56
Oregon	9.99	16.32	8.67	34.98	28.83	23.28	59.58	37.79	30.41	31.13
California	10.99	11.49	6.57	29.05	30.36	28.02	54.03	12.83	23.92	25.01
Pacific	10.74	12.24	7.01	29.99	31.64	28.44	55.33	15.65	26.53	27.24
Average for 48 States & D. C.	5.85	12.65	11.72	30.22	34.69	17.94	55.60	25.38	30.15	30.20
Hawaii	12.55	5.66	18.51	36.72	25.50	19.79	58.88	62.19	31.69	34.22
Puerto Rico	11.96	5.44	10.26	27.66	22.23	22.31	53.13	75.60	22.44	26.48
United States: 1957-58	5.96	12.53	11.73	30.22	34.43	17.95	55.67	25.48	30.11	30.18
1956-57	5.74	12.36	5/ 11.43	5/ 29.53	32.62	17.92	55.20	24.14	28.81	29.30
1955-56	5.39	12.08	11.20	28.67	32.36	16.55	55.64	28.71	27.44	28.29

1/ Excluding fertilizers not guaranteed to contain one or more of the primary plant nutrients, N, P_2O_5, or K_2O.
2/ Guaranteed to contain two or more of the primary plant nutrients. 3/ Guaranteed to contain one of the primary plant nutrients. 4/ Including 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application. 5/ Revised.

TABLE 11—Primary plant nutrients consumed in mixtures and in mixtures and materials combined, by State and region, year ended June 30, 1958

Tons

State and region	Mixtures: N	Mixtures: P_2O_5 Available	Mixtures: P_2O_5 Total	Mixtures: K_2O	Mixtures: Total N, available P_2O_5, and K_2O	Mixtures and materials: N	Mixtures and materials: P_2O_5 Available 1/	Mixtures and materials: P_2O_5 Total 2/	Mixtures and materials: K_2O	Mixtures and materials: Total N, available P_2O_5, and K_2O
Maine	13,936	20,472	21,142	22,010	56,418	14,533	21,534	22,235	22,125	58,192
New Hampshire	1,092	2,047	2,116	2,209	5,348	1,446	2,511	2,596	2,321	6,278
Vermont	1,931	6,157	6,346	6,607	14,695	2,409	9,243	9,589	6,787	18,439
Massachusetts	4,986	7,230	7,518	6,714	18,870	6,368	8,327	8,746	7,196	21,891
Rhode Island	957	1,589	1,657	1,580	4,126	1,137	1,675	1,714	1,621	4,433
Connecticut	3,829	5,868	6,151	6,094	15,791	5,383	7,431	7,815	6,824	19,638
New England	26,671	43,363	44,930	45,214	115,248	31,236	50,721	52,635	46,874	128,831
New York	36,427	66,417	68,939	57,134	159,978	46,085	74,049	77,055	58,850	178,984
New Jersey	11,007	21,044	21,695	20,448	52,499	13,930	22,345	23,113	21,089	57,364
Pennsylvania	30,746	71,633	74,325	67,335	169,714	37,274	78,618	82,807	68,647	184,539
Delaware	4,133	9,097	9,456	9,704	22,934	4,915	9,212	9,638	9,808	23,935
District of Columbia	283	284	308	161	668	276	329	347	172	776
Maryland	12,684	29,494	31,077	27,322	69,430	15,357	30,447	32,587	27,744	73,548
West Virginia	2,955	7,881	8,382	6,844	17,680	3,597	9,243	9,843	6,968	19,808
Middle Atlantic	98,175	205,780	214,176	188,948	492,903	121,434	224,243	235,464	193,813	539,890
Virginia	26,353	68,499	73,016	69,249	164,061	39,203	71,517	76,580	72,128	182,848
North Carolina	54,102	113,699	122,564	127,096	294,857	110,625	117,244	126,373	134,539	362,408
South Carolina	21,691	52,983	56,693	53,614	128,228	57,984	55,511	59,533	63,165	176,660
Georgia	43,648	106,002	112,079	112,823	262,473	100,170	110,126	117,710	116,984	327,280
Florida	77,841	87,529	106,663	116,833	282,203	103,766	92,494	115,170	121,181	317,443
South Atlantic	223,635	420,612	471,015	479,575	1,123,822	411,348	446,892	495,366	507,932	1,366,172
Ohio	53,696	137,188	143,583	126,110	316,994	71,184	145,674	154,664	131,784	348,642
Indiana	51,996	143,748	148,352	135,051	330,795	96,682	155,310	166,009	177,989	429,981
Illinois	37,997	84,352	88,012	79,689	201,638	96,672	137,830	144,287	140,090	374,592
Michigan	34,468	92,623	96,179	86,767	213,858	47,433	96,773	101,641	91,723	235,929
Wisconsin	17,488	64,477	67,321	80,107	162,072	26,193	67,289	71,107	86,604	180,086
East North Central	195,205	522,388	543,387	507,724	1,225,317	338,164	602,876	707,708	628,190	1,569,230
Minnesota	19,257	69,307	71,489	47,644	136,208	49,448	93,178	96,234	55,017	197,643
Iowa	23,357	63,548	66,231	43,609	130,514	65,391	92,835	98,230	52,002	210,888
Missouri	38,347	56,821	59,460	49,519	144,687	83,943	71,762	135,240	60,706	216,411
North Dakota	4,043	8,807	9,049	1,672	14,522	12,923	36,483	37,108	1,674	51,080
South Dakota	1,416	2,443	2,612	144	4,003	6,368	7,607	7,986	149	14,129
Nebraska	3,419	7,288	7,380	1,299	12,006	94,194	19,800	20,369	1,580	115,474
Kansas	7,803	16,555	17,038	3,445	27,803	39,497	37,524	38,638	4,053	81,074
West North Central	97,642	224,769	233,259	147,332	469,743	351,718	359,189	433,743	175,132	886,039
Kentucky	22,730	52,026	56,267	53,281	128,037	37,934	61,013	68,564	60,880	159,827
Tennessee	22,779	48,714	52,431	46,524	118,017	42,907	55,609	59,884	53,887	152,403
Alabama	25,038	77,622	82,903	71,803	174,463	72,059	86,546	92,937	76,957	235,562
Mississippi	15,665	25,469	27,365	21,126	62,260	108,320	39,834	43,816	29,836	177,990
East South Central	86,212	203,831	218,966	192,734	482,777	261,220	243,002	265,201	221,560	725,782
Arkansas	9,215	20,761	21,777	19,037	49,013	52,621	26,290	27,553	33,180	112,091
Louisiana	10,336	20,037	21,131	16,974	47,347	53,832	23,404	25,772	18,790	96,026
Oklahoma	4,746	10,598	11,029	4,289	19,633	9,900	20,551	22,134	4,583	35,034
Texas	24,429	46,348	48,371	22,934	93,711	144,523	84,756	90,880	24,612	253,891
West South Central	48,726	97,744	102,308	63,234	209,704	260,876	155,001	166,339	81,165	497,042
Montana	620	932	969	60	1,612	4,458	11,964	12,336	93	16,515
Idaho	1,484	1,616	1,684	198	3,298	21,987	13,985	14,819	821	36,793
Wyoming	187	287	304	28	502	2,811	3,020	3,088	32	5,863
Colorado	1,741	2,630	2,790	1,101	5,472	18,235	14,350	14,649	1,415	34,000
New Mexico	333	564	590	119	1,016	8,551	7,559	7,776	202	16,312
Arizona	4,304	5,934	6,164	1,266	11,504	48,440	20,160	20,607	1,831	70,431
Utah	372	628	672	204	1,204	7,598	6,547	6,764	232	14,377
Nevada	233	240	249	60	533	926	924	959	74	1,924
Mountain	9,354	12,831	13,422	3,036	25,221	113,000	78,509	80,998	4,706	196,215
Washington	6,870	6,656	6,920	4,036	14,962	66,329	17,376	17,969	6,326	90,031
Oregon	2,815	4,598	4,760	2,442	9,855	39,505	12,606	13,088	3,551	55,662
California	31,238	34,730	35,500	19,870	87,838	3/ 238,586	4/ 85,920	4/ 87,793	5/ 30,856	355,362
Pacific	40,923	45,984	47,182	26,348	112,655	344,420	115,902	118,850	40,733	501,055
Total	825,943	1,785,302	1,888,645	1,654,145	4,265,390	2,233,416	2,276,335	2,636,304	1,899,505	6,409,256
Hawaii	7,556	3,409	3,560	11,144	22,109	17,917	6,297	7,304	16,834	41,048
Puerto Rico	21,705	9,879	11,247	18,621	50,205	33,026	10,258	11,631	18,799	62,083
United States: 1957-58	855,204	1,798,590	1,903,452	1,683,910	4,337,704	6/ 2,284,359	7/ 2,292,890	8/ 2,655,259	1,935,138	6,512,387
1956-57	843,626	9/ 1,817,626	10/ 1,926,774	11/ 1,681,121	4,342,373	2,135,287	9/ 2,304,992	9/ 2,669,942	11/ 1,936,923	6,377,202
1955-56	796,673	1,785,073	1,897,790	1,654,992	4,236,698	1,933,342	2,247,420	2,643,418	1,874,718	6,055,480

1/ Including 2 percent of the colloidal phosphate and 3 percent of the phosphate rock marketed for direct application. 2/ Including an average of 21.71 percent of the colloidal phosphate and 31.68 percent of the phosphate rock marketed for direct application. Including an estimated: 3/ 3,426 tons, 4/ 3,153 tons, and 5/ 6,763 tons marketed as dried manures. Including: 6/ 976 tons, 7/ 6,445 tons, and 8/ 6,578 tons in materials distributed by Government agencies for test demonstrations. 9/ Revised by addition of 1,001 tons in North Dakota. 10/ Revised by addition of 360 tons in Kansas and 1,001 tons in North Dakota. 11/ Revised by subtraction of 1,340 tons in Pennsylvania.

TABLE 12—Change in consumption of primary nutrients, year ended June 30, 1958, compared with preceding year

Tons

State and region	Mixtures: N	Mixtures: P_2O_5 Available	Mixtures: P_2O_5 Total	Mixtures: K_2O	Mixtures: Total (N, avail. P_2O_5, and K_2O)	Materials: N	Materials: P_2O_5 Available	Materials: P_2O_5 Total	Materials: K_2O	Materials: Total (N, avail. P_2O_5, and K_2O)
Maine	1,594	1,275	1,187	1,308	4,177	-878	348	351	12	-518
New Hampshire	104	68	72	81	253	-125	29	38	29	-67
Vermont	338	174	183	196	708	57	-167	-172	14	-96
Massachusetts	228	312	308	-567	-27	119	-73	-88	-59	-13
Rhode Island	72	13	-2	1	86	11	-4	-52	-15	-8
Connecticut	-134	-497	-528	-210	-841	182	-121	-149	-66	-5
New England	2,202	1,345	1,220	809	4,356	-634	12	-72	-85	-707
New York	3,859	5,426	4,083	6,764	16,049	1,612	-1,157	-1,231	377	832
New Jersey	-2,402	-4,981	-5,118	-4,856	-12,239	95	-253	-265	50	-108
Pennsylvania	261	2,394	2,434	811	3,466	1,064	-783	-458	114	395
Delaware	-118	-599	-654	-623	-1,340	-76	-120	-122	-125	-321
District of Columbia	117	106	112	70	293	13	10	7	4	27
Maryland	44	-1,543	-1,631	-1,255	-2,754	455	-119	-140	-37	299
West Virginia	-303	-806	-846	-879	-1,988	-105	-80	-54	38	-147
Middle Atlantic	1,458	-3	-1,620	32	1,487	3,058	-2,502	-2,263	421	977
Virginia	-488	-5,486	-5,921	-3,790	-9,764	-760	417	634	38	-305
North Carolina	2,891	-2,339	-2,499	6,498	7,050	-6,101	-404	-545	-506	-7,011
South Carolina	-851	-3,258	-3,546	-1,245	-5,354	-6,947	-1,026	-1,166	-2,651	-10,624
Georgia	-6,989	-3,112	-3,564	719	-9,382	8,303	425	1,677	-203	8,525
Florida	794	-3,223	-3,723	4,078	1,649	3,538	1,554	-2,605	671	5,763
South Atlantic	-4,643	-17,418	-19,253	6,260	-15,801	-1,967	966	-2,005	-2,651	-3,652
Ohio	2,908	671	245	-3,058	521	3,723	1,050	2,062	1,593	6,366
Indiana	2,261	-1,370	-1,703	-3,763	-2,872	9,939	1,390	1,349	4,878	16,207
Illinois	3,838	6,813	7,075	5,746	16,397	12,544	4,021	5,381	1,907	18,472
Michigan	-1,188	2,651	2,743	1,236	2,699	2,137	523	873	2,764	5,424
Wisconsin	1,262	1,594	2,314	4,261	7,117	2,483	294	85	918	3,695
East North Central	9,081	10,359	10,674	4,422	23,862	30,826	7,278	9,750	12,060	50,164
Minnesota	776	-2,029	-1,649	-1,912	3,165	10,406	1,235	1,307	1,949	13,590
Iowa	2,662	7,115	7,366	2,801	12,578	12,245	4,911	4,148	2,608	19,764
Missouri	867	-7,896	-8,117	-6,159	-13,788	477	-76	2,481	-2,331	-1,930
North Dakota	630	-474	-469	62	218	3,835	8,099	8,236	-14	11,920
South Dakota	322	47	62	-15	354	2,525	1,026	1,040	10	3,561
Nebraska	950	1,726	1,747	246	2,922	30,188	-3,426	-3,428	-29	26,733
Kansas	-884	-2,624	-2,700	-898	-4,406	2,647	-3,212	-3,316	-298	-863
West North Central	4,723	-4,135	-3,760	-5,875	-5,287	62,323	8,557	10,468	1,895	72,775
Kentucky	1,356	249	187	669	2,274	986	-2,124	-2,865	-624	-1,762
Tennessee	-176	-1,941	-2,069	-1,746	-3,863	-5,572	-749	-677	-606	-6,927
Alabama	-2,842	-6,193	-6,661	-1,255	-10,290	-3,604	-957	-1,448	-623	-5,184
Mississippi	-2,339	-4,357	-4,673	-4,573	-11,269	-14,021	-3,378	-3,749	-5,534	-22,933
East South Central	-4,001	-12,242	-13,216	-6,905	-23,148	-22,211	-7,208	-8,739	-7,387	-36,806
Arkansas	95	688	677	151	934	-5,992	-2,033	-2,089	-3,936	-11,961
Louisiana	-61	-2,396	-2,451	308	-2,149	740	-369	-206	-1,582	-1,211
Oklahoma	-211	-169	-200	-74	-454	143	382	653	33	558
Texas	2,124	341	421	1,361	3,826	33,001	-3,304	-1,731	511	30,208
West South Central	1,947	-1,536	-1,553	1,746	2,157	27,892	-5,324	-3,373	-4,974	17,594
Montana	187	135	138	16	338	-1,638	-347	-364	-1	-1,986
Idaho	81	108	-35	-16	173	7,514	1,005	1,623	489	9,008
Wyoming	24	47	49	-4	67	780	110	106	-15	875
Colorado	440	520	559	310	1,270	6,262	1,321	1,317	-132	7,451
New Mexico	145	314	324	64	523	349	-523	-555	-26	-200
Arizona	956	1,755	1,810	432	3,143	5,690	2,885	2,917	-140	8,435
Utah	-153	-82	-90	17	-218	2,551	933	911	-3	3,481
Nevada	120	97	96	-6	211	134	372	387	12	518
Mountain	1,800	2,894	2,851	813	5,507	21,642	5,756	6,342	184	27,582
Washington	1,188	1,950	2,010	804	3,970	21,200	3,722	3,820	482	25,404
Oregon	281	-160	-170	-175	-54	-2,979	-2,090	-2,054	1	-5,068
California	3,028	5,973	5,981	4,073	13,074	12,290	-409	-931	-7	11,874
Pacific	4,497	7,771	7,821	4,722	16,990	30,511	1,223	835	476	32,210
Total	17,064	-12,965	-16,830	6,024	10,123	151,440	8,758	10,943	-61	160,137
Hawaii	-129	-2,411	-2,461	13	-2,527	-12,551	-1,657	-2,137	-4,573	-18,781
Puerto Rico	-5,357	-3,660	-4,085	-3,248	-12,265	-1,395	-167	-167	60	-1,502
United States	11,578	-19,036	-23,322	2,789	-4,669	137,494	6,934	8,639	-4,574	139,854

TABLE 13—Primary plant nutrients consumed in regions and United States as mixtures and as direct-application materials, by kinds, year ended June 30, 1958

Tons

Kind	New England	Middle Atlantic	South Atlantic	East North Central	West North Central	East South Central	West South Central	Mountain	Pacific	Hawaii and Puerto Rico	United States
Nitrogen											
MIXTURES: N-P-K	26,670	98,147	198,297	191,508	80,363	85,126	45,021	4,149	28,763	24,172	782,176
N-P	1	16	24	3,657	17,265	651	3,704	5,193	11,360	121	42,000
N-K	0	12	25,354	40	14	435	1	18	198	4,968	31,088
MATERIALS.											
Ammonia, anhydrous	0	2,040	20,669	46,921	114,200	42,594	114,880	35,101	102,110	634	479,109
" , aqua	0	0	170	556	1,896	9	1,618	5,394	57,824	5,877	73,342
Ammonium nitrate	1,603	10,706	46,042	46,329	82,097	95,997	35,832	23,712	34,371	0	376,689
Ammonium nitrate-limestone mixtures	34	453	46,591	417	36	6,369	110	736	12	0	54,758
Ammonium sulfate	109	931	2,451	20,279	2,468	2,469	20,596	13,289	46,980	11,089	120,561
Bonemeal: raw and steamed	48	118	35	47	8	8	13	1/	96	0	377
Calcium cyanamide	288	1,890	1,886	214	39	2,007	1,341	247	1,825	0	9,737
Calcium nitrate	1/	1/	1,569	18	0	23	20	1,866	5,351	17	8,864
Natural organics	1,385	1,731	1,220	2,077	607	90	335	345	5,469	7	13,266
Nitrogen solutions	273	1,397	23,856	17,731	29,383	2,997	7,302	1,862	15,096	0	99,897
Phosphate products	0	76	331	2,050	21,438	742	13,640	12,208	22,438	395	73,380
Potassium products	24	1	1,979	6	0	187	3	0	3	0	2,203
Sodium nitrate	253	1,663	39,039	224	46	20,998	7,992	80	62	28	70,339
Urea	490	1,663	1,734	419	1,726	548	8,462	8,655	12,316	3,701	44,714
Other chemical nitrogen products	64	590	141	671	140	10	78	151	184	0	2,029
Total nitrogen	31,236	121,434	411,348	338,164	351,718	261,220	260,876	113,000	344,420	50,943	2,284,359
Available P_2O_5											
MIXTURES: N-P-K	37,640	185,669	406,202	463,771	171,123	175,771	84,155	6,342	33,668	12,236	1,576,577
N-P	3	44	17	16,340	38,728	680	7,467	6,338	11,814	493	81,984
P-K	5,720	20,067	22,393	42,277	14,918	27,380	6,122	151	508	559	140,089
MATERIALS:											
Ammonium phosphate: 11-48	0	229	22	4,706	21,966	5	1,688	4,472	6,889	538	40,449
" 13-39	0	0	0	87	7,263	9	5,003	2,264	2,421	0	17,047
Ammonium phosphate sulfate: 16-20	0	0	0	193	15,569	15	13,095	9,752	21,374	52	60,050
Ammonium phosphate nitrate: 27-14	0	0	0	0	465	0	0	670	1,473	0	2,608
Basic slag	0	0	1,554	0	0	10,028	273	0	0	0	11,855
Bonemeal: raw and steamed	385	1,074	322	531	59	81	86	1/	493	0	3,031
Calcium metaphosphate	0	371	1,539	7,298	9,779	8,800	532	169	16	0	28,504
Diammonium phosphate: 21-53	0	61	837	2,062	2,972	1,876	1,624	4,213	994	603	14,802
Natural organics	674	968	559	1,534	603	63	286	260	4,505	4	9,456
Phosphate rock and colloidal phosphate	8	287	552	16,978	6,518	422	590	5	39	84	25,383
Phosphoric acid	0	0	0	0	0	0	863	5,762	5,574	0	12,199
Potassium products	10	0	35	0	0	0	0	0	0	0	45
Superphosphate: 22% and under	6,120	14,184	9,728	11,956	8,362	14,847	12,041	3,137	13,715	1,192	95,282
" over 22%	47	1,349	2,658	35,143	60,864	2,961	19,616	34,974	12,436	800	170,848
Other phosphate products	114	0	474	0	0	64	0	0	489	0	1,141
Total available P_2O_5	50,721	224,243	446,892	602,876	359,189	243,002	155,001	78,509	115,902	16,555	2,292,890
K_2O											
MIXTURES: N-P-K	37,990	166,819	415,433	450,882	133,161	164,946	57,510	2,937	25,719	21,097	1,477,294
P-K	7,224	22,116	33,834	56,799	14,194	27,190	5,723	98	479	895	168,510
N-K	0	13	30,308	43	17	598	1	3	190	6,973	38,106
MATERIALS.											
Lime-potash mixtures	0	5	1,268	0	0	380	0	0	0	0	1,653
Manure salts	0	1	90	0	0	0	7	0	0	0	98
Natural organics	295	360	196	928	231	24	86	63	7,075	1	8,857
Potassium chloride	1,091	2,902	21,507	117,337	27,490	24,800	17,398	1,000	3,698	4,741	221,918
" magnesium sulfate	16	306	449	759	78	251	269	9	59	1	2,197
" sodium nitrate	0	1	1,993	6	0	160	0	0	0	0	2,160
" sulfate	58	685	2,641	1,701	1	3,211	61	598	3,369	1,125	13,650
Other potassium products	200	5	311	1	0	110	0	0	0	0	631
Total K_2O	46,874	193,813	507,932	628,190	175,132	221,560	81,165	4,706	40,733	35,633	1,935,138
GRAND TOTAL: N, avail. P_2O_5, K_2O	128,831	539,890	1,366,172	1,569,230	886,039	725,782	497,042	196,215	501,055	103,131	6,512,387

1/ Less than 0.5 ton.

USDA Recommends Use of Antiseptic Tree Wound Dressing

WASHINGTON—Adding a fungicidal chemical to asphalt varnish used in painting tree wounds prevents growth in the paint of fungi that cause decay in shade trees, and may provide protection of tree wounds from decay infection, U.S. Department of Agriculture research has shown. Earlier research demonstrated that this antiseptic paint also controls a canker-forming fungus.

Laboratory experiments by Dr. Curtis May and John G. Palmer of USDA's Agricultural Research Service established the antiseptic quality of asphalt varnish containing 0.25% phenyl mercury nitrate against fungi causing wood decay. The tests showed also that asphalt varnish alone and asphalt varnish combined with several other common fungicidal chemicals were not effective antiseptics. Many tree-rotting fungi can live in nonantiseptic asphalt varnish.

Reporting these research results to the American Phytopathological Society meeting at Pennsylvania State University, the scientists said that their findings may help fill the need of tree surgeons for an acceptable antiseptic to apply to wounds of freshly pruned or trimmed trees.

Although asphalt varnish containing phenyl mercury nitrate is not now widely available to home gardeners, these findings may make it profitable to industry to market such a product for home use. The scientists caution home owners against mixing their own antiseptic varnish, because phenyl mercury nitrate is highly toxic. Some persons are sensitive to mercurials carried in oils. Those using varnish fortified with phenyl mercury nitrate in this concentration should handle it cautiously and should immediately remove paint spots from the skin.

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A WEEKLY NEWSPAPER FOR THE FARM CHEMICAL INDUSTRY

The regional circulation of this issue is concentrated in the Southern states.

TIME FOR REFLECTION . . .

Farm Prices at Low Ebb When World War II Began . . . Fertilizer Prices Continue Low

TWO DECADES AGO this week, the world sat in stunned awe as Hitler's hordes swarmed over Poland to ignite World War II. A new generation has now come on the scene and, to many of these younger people, the events of September, 1939 seem about as ancient as war tales of the 19th century.

But to many business pepole serving agriculture, the ghost of those days twenty years ago seems to defy the passing of time and continues to hang around. Reflections on the prices of farm produce when World War II began could still bring goose pimples to those who had to depend upon the farmer for their livelihood.

Still, the basic cost of fertilizers and many old-line pesticides has not risen to any significant extent when compared with the way farm prices themselves have accelerated. Figures on the situation show how farm prices and costs have more than doubled in the past 20 years. They illustrate as graphically as anything we know, the shrinkage of the dollar and the extent to which inflation has asserted itself during these past two decades.

The University of Illinois has presented the following figures on a number of commodities to emphasize the point:

Hogs. In August, 1939 the average price received by farmers for hogs was $5.30 cwt. Prices went down that fall, and by June, 1940 they averaged $4.78. The July, 1959 average was $13.30, or 2.8 times as high as 20 years before.

Corn. Farmers got 46¢ a bushel for corn in August, 1939. They got 47¢ for the whole 1938 crop, which they were selling when World War II opened in Europe. Our recent July average was $1.13, or 2.5 times the prewar price.

Wheat. The 1938 wheat crop sold for an average price of 56¢ a bushel. In August, 1939, farmers were selling their new wheat for 55¢. Last month, farmers received an average price of $1.70 a bushel, about three times the 1939 price.

Oats. Oats were going for 25¢ a bushel 20 years ago. Farmers had sold their previous crop for 23¢. This year the average price for July was 61¢ a bushel, or 2.6 times the prewar price.

Soybeans. Soybeans were still a new crop when World War II began. In 1938, production totaled only 62 million bushels compared with 574 million in 1958. The average price received for the 1938 crop was 66¢, and beans were going for 64¢ in August, 1939. The average for July of this year was $2.05, or 3.1 times the 1939 price.

Beef cattle. Twenty years ago, just before World War II, the average price received by U.S. farmers for beef cattle was $6.74 cwt. That was for all classes and grades. The comparable price for last month was $23.10, which was 3.4 times the price received 20 years ago.

Calves. Veal calves went for $8.00 cwt. in 1939 compared with $28.00 last month. The 1959 price was 3.5 times that of 1939.

Milk. Farmers got $1.69 cwt. for milk in 1939. In July they got about $3.88, or 2.3 times the price of 20 years ago.

Altogether prices received by U.S. farmers were about 2.6 times as high in July of this year as they were 20 years ago.

Of course, prices of commodities that farmers buy have increased almost as much as prices of the products they sell. Average prices of farm equipment and supplies are about 2.2 times as high as they were before the war. Average prices of the things farm people buy for family use are about 2.4 times as high as prices of 20 years ago.

Still, fertilizers and many pesticides remain relatively cheap. A strange commentary indeed.

Fertilizer Tonnages Up for Fiscal Year 1958-59

FERTILIZER TONNAGES, though a little disappointing during the fiscal year ending June 30, 1958, as reported fully in this issue of Croplife, show every indication of having had a resurgence during the fertilizer year just ended.

Indiana was one of the first states to complete and publish its tonnage reports for the year ended June 30, 1959. It shows exciting increases in key plant food products and no doubt constitutes a preview of subsequent reports from other states. Indiana has reported almost spectacular increases in the consumption of anhydrous ammonia, nitrogen solutions, urea and nitrogen materials. Here are some of the figures presenting comparisons and the percentage of change in some key items:

Product	1957-58 Tons	1958-59 Tons	—Increase— Tons	%
Ammonium Nitrate	44,497	49,172	4,675	10.5
Anhydrous Ammonia	18,555	27,962	9,407	50.7
Nitrogen Solutions	25,098	49,351	24,253	96.6
Nitrate of Soda ..	121	148	27	22.3
Urea	6,010	8,279	2,269	37.8
Nitrogen Materials	108,804	146,708	37,904	34.8
Nitrogen-Phosphate Mixtures	32,696	36,865	4,169	12.8
Mixed Fertilizers..	859,426	928,203	68,777	8.0
Total tonnage.	1,080,465	1,172,657	92,192	8.5

The Indiana report showed a few decreases in use of some products, too. These included ammonium sulfate, down 18.6%; potash materials, down 5.5%; rock phosphate down 49.9% and superphosphate down 1.5%.

Fertilizer manufacturers operating in Indiana will be interested in the way some significant ratios of plant food have increased in popularity during the past year. The 1:4:4 ratio moved up from 464,946 tons to 507,748, for an increase of 9.2%. The 1:1:1 ratio enjoyed nearly as great an increase, going from 214,714 tons to 233,778, or 8.9%.

This report from an important midwestern state may be the first of many additional happy statistics from other states and regions of the U.S. The USDA report appearing in this issue mirrors the nation's use of plant food during the now long-gone year of 1957-58, and the industry will be inclined to regard it as the bottom of an upswinging curve which should record more and more use of plant food in the years ahead.

Intercepted Pests

CHECKING THE luggage of tourists returning from abroad, in search of possible insect pests sneaking into the U.S., is a big job. Last year, quarantine inspectors of the Agricultural Research Service intercepted a destructive plant pest every half-hour in luggage, airplanes, ships, autos and trains from foreign lands. These pests included several already in the U.S. but under rigid quarantine: Khapra beetle, Mexican fruit fly, pink bollworm and golden nematode. The Mediterranean fruit fly, presently eradicated from the U.S., was intercepted about 100 times last year.

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CROPLIFE is a controlled circulation journal published weekly. Weekly distribution of each issue is made to the fertilizer manufacturers, pesticide formulators and basic chemical manufacturers. In addition, the dealer-distributor-farm adviser segment of the agricultural chemical industry is covered on a regional (crop-area) basis with a mailing schedule which covers consecutively, one each week, four geographic regions (Northeast, South, Midwest and West) of the U.S. with one of four regional dealer issues. To those not eligible for this controlled distribution Croplife subscription rate is $5 for one year ($8 a year outside the U.S.). Single copy price, 25¢.

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Oct. 7-8 — Symposium on Research Progress on Insect Resistance, Mayflower Hotel, Washington.

Oct. 29-30 — Eastern Branch, Entomological Society of America, Chalfonte-Haddon Hotel, Atlantic City, N.J.

Nov. 3-4—Michigan Insecticide-Fungicide Conference, Michigan State University, East Lansing, Mich.

Nov. 9—South Carolina Plant Food Educational Society annual meeting, Clemson House, Clemson, S.C.

1960

Jan. 20-22—Southern Weed Conference, 13th annual meeting, Biloxi, Miss.

Jan. 25-27—Cotton States Branch, Entomological Society of America, DeSoto Hotel, Savannah, Ga.

Jan. 28-29—Annual meeting of the Colorado Agricultural Chemicals Assn., Cosmopolitan Hotel, Denver, Colo.

March 23-25—North Central Branch, Entomological Society of America, Schroeder Hotel, Milwaukee, Wis.

June 27-29—Pacific Branch, Entomological Society of America, Davenport Hotel, Spokane, Wash.

Meeting Memos listed above are being listed in this department this week for the first time.

Sept. 10—New pesticide review for Central California, sponsored by Western Agricultural Chemicals Assn., Fresno Fairgrounds, Fresno, Cal.

Sept. 13-18—American Chemical Society, national meeting, Haddon Hall Hotel, Atlantic City, N.J.

Sept. 17—New Jersey Fertilizer Conference, Rutgers University, New Brunswick, N. J.

Sept. 20-23—Seventh Annual Meeting Canadian Agricultural Chemicals Assn., Chateau Frontenac, Quebec City.

Sept. 24—Fertilizer Technology & Economics School & Tour for California Bankers, University of California, Berkeley, Cal.

Sept. 24-25 — Annual North-Eastern Fertilizer Conference, NPFI, Biltmore Hotel, New York, N.Y.

Sept. 25—Annual Crops Day, University of Arizona, Safford, Ariz.

Sept. 30-Oct. 1—Fourth Southeastern Fertilizer Conference, Atlanta Biltmore Hotel, Atlanta, Ga.

Oct. 12-14—Association of Official Agricultural Chemists, annual meeting, Shoreham Hotel, Washington, D.C.

Oct. 13-14—Western Agricultural Chemicals Assn., fall meeting, Villa Motel, San Mateo, Cal., C. O. Barnard, executive secretary.

Oct. 14-16—Pacific Northwest Plant Food Assn. Annual Convention, Chinook Hotel, Yakima, Wash.

Oct. 15—NPFI Conference on Chemical Control Problems, Shoreham Hotel, Washington, D.C.

Oct. 16—Association of American Fertilizer Control Officials, Shoreham Hotel, Washington, D.C.

Oct. 16-17—American Pesticide Control Officials, annual meeting, Shoreham Hotel, Washington, D.C.

Oct. 19-23—Fertilizer Section, National Safety Council, annual meeting, Chicago.

Oct. 21-23 — National Agricultural Chemicals Assn., 26th annual meeting, French Lick-Sheraton Hotel, French Lick, Ind., Lea S. Hitchner, executive secretary.

Oct. 27—Seventh Annual Grassland Farming Conference, Extension Service, Rutgers University College of Agriculture, New Brunswick, N.J.

Nov. 4-5—Fifth Annual Oklahoma Fertilizer Dealers and Crops and Soils Conference, Stillwater, Okla.

Nov. 4-6—Fertilizer Industry Round Table, Mayflower Hotel, Washington, D.C. Dr. Vincent Sauchelli, National Plant Food Institute, chairman.

Nov. 8-10—National Fertilizer Solutions Assn., Annual Convention, Statler Hilton Hotel, St. Louis; Muriel F. Collie, 2217 Tribune Tower, Chicago 11, executive secretary.

Nov. 9-11 — California Fertilizer Assn., 36th annual convention, Fairmont Hotel, San Francisco.

Nov. 12-13 — Southwest Fertilizer Safety School, Tropicana Motor Hotel, Pasadena, Texas.

Nov. 16-20 — National Aviation Trades Assn., 20th annual convention, New Orleans, La.

Nov. 30-Dec. 4—27th Exposition of Chemical Industries, New York Coliseum, New York City.

Nov. 30-Dec. 5—Joint meeting, Entomological Society of Ontario; Entomological Society of Canada and Entomological Society of America, Hotel Sheraton-Cadillac, Detroit, Mich.

Dec. 1-2—Annual meeting, Carolinas-Virginia Pesticide Formulators Assn., Carolina Hotel, Pinehurst, N.C.

Dec. 2-3—Annual Missouri Fertilizer Conference, Columbia, Mo.

Dec. 7-10—Central Canada and North Central Weed Control Conferences, Royal Alexandra Hotel, Winnipeg, Manitoba, Can.

Dec. 8-10—Joint Meeting of Western Canadian and North Central Weed Control Conferences, Winnipeg, Manitoba.

Dec. 9-11—International Crop Protection and Pest Control Exhibition, Seymour Hall, St. Marylebone, London, England.

Dec. 10-11—Annual Arkansas Plant Food Conference, Little Rock, Ark.

1960

Jan. 5-6—Annual Texas Fertilizer Conference, College Station, Texas.

Jan. 6-8—14th Annual Meeting, Northeastern Weed Control Conference, Hotel New Yorker, New York City.

Jan. 13-15—Ninth Annual Convention, Agricultural Ammonia Institute, Statler Hilton Hotel, Dallas, Texas.

Jan. 14-16—10th Annual Convention of the Agricultural Aircraft Assn., El Mirador Hotel, Palm Springs, Cal.

Jan. 20-22—Thirteenth Annual Southern Weed Conference, Buena Vista Hotel, Biloxi, Miss.

Jan. 20-21—North West Agricultural Chemicals Industry Conference, Benson Hotel, Portland, Ore., C. O. Barnard, executive secretary.

Feb. 8-9—Southwestern Branch, Entomological Society of America, Hilton Hotel, El Paso, Texas.

July 13-15—Eleventh Annual Fertilizer Conference of the Pacific Northwest, Hotel Utah, Salt Lake City; B. R. Bertramson, State College of Washington, Pullman, Wash., chairman.

July 27-29—Great Plains Agricultural Council, 1960 meeting, Laramie, Wyo.

CALENDAR FOR 1959-60

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